Appendix A. Inventory and analysis

A.1 Ecosystem-wide processes and characterization

This section applies to the ecosystem-wide functions and processes described in WAC 173.206.201 (3)d.i. The discussion includes climate and weather, geology, soils, vegetation and land uses, water resource development, hydrography, hydrology, water quality, water uses, aquatic/fish resources, limiting factors, riparian condition, fine sediment, water quantity and quality, agricultural, urban and rural development, exotic species, terrestrial/wildlife resources, and a discussion on habitat types. It is important to keep in mind that within Douglas County there are no streams or rivers except for the Columbia River, so several elements suggested in the WAC guidelines do not apply, such as discussions on base flows, timing, volume and distribution of large woody debris, channel migration and others.

Nearly all of the lakes are isolated and are closed basins. Area of drainage was not determined for most as the topography is flat to lightly rolling making boundaries difficult to discern- both in GIS and on paper. Many are alkaline and very little information, if any, exists for them. Lakes are specifically discussed in the reach sections because most have only one or two reaches. Hyporheic functions are largely unknown within the area.

The spatial and temporal connectivity within watersheds and along shorelines were considered using a habitat rating system described in the geographic information system (GIS) inventory description. Drainage networks are largely open and connected between the interior lakes, but restricted either vertically or horizontally along the river, typically by development or roads. This was also addressed in the aforementioned analysis. One component of drainages running into the Columbia River is their use as corridors for mule deer. It is recognized that these exist, although the area along the jurisdictional area of the river is minimal. Douglas County critical areas standards are included in Appendix H and address this subject.

Climate and Weather

The climate of Douglas County is influenced by elevation, topography, distance and direction from the ocean, prevailing westerly winds and the position and intensity of the high and low pressure centers in the western Pacific Ocean. Located in the rain shadow of the Cascade Mountain Range, the area is classified as arid to semiarid with low levels of annual precipitation, cold winters and hot, dry summers. Precipitation can vary widely in relation to topographic features but in general much of the subbasin receives less than 15 inches of annual precipitation and most of that precipitation falls in winter.

Air temperatures vary widely depending on topography and location. Summertime air temperatures generally exceed 100 ºF for one to several days each year. Winter temperatures can also drop below 0 ºF, but in general they are in the 20 to 40 ºF range. Along the Columbia River, winter and spring air temperatures remain very stable. The

growing season ranges from 170 days (May-September) at Bridgeport and East Wenatchee to 135 days on the eastern plateau.

Due to the climate and geology, interior lakes and wetlands can vary quite dramatically from year to year. Most of the lakes are closed basins, so dryer and wetter years affect water quantity and quality.

Geology

Douglas County's topography ranges from lowland areas along the Columbia River corridor to a high point on Badger Mountain with an approximate elevation of 4100 feet, but it is, for the most part, a mildly rolling plateau. Besides being surrounded by water, the County has several streams and lakes that provide a range of recreational opportunities.

Douglas County is located close to the geographical center of Washington State. It lies on the northern edge of the Columbia Basin in the shelter of the Cascade Mountains to its West. It is bordered on the north and west by the Columbia River and on the east by the Grand Coulee Equalization Reservoir (Banks Lake) and Sun Lakes. Roughly oval in shape, it is about 70 miles long and 40 miles wide encompassing 1,831 square miles with its main axis lying in a northeasterly direction.

Douglas County is on the western edge of the extensive Columbia River Plateau formed by the extrusion of lava throughout much of Eastern Washington during the Eocene, Miocene and Pliocene epochs. The region was warped into the form of broad basins, some of which were formed by locally steeper folding and by faulting. During the Pleistocene or glacial epoch, the sub-basins accumulated deposits of clay, silt, sand and gravel. Some of the deposits left by the glaciers are more conspicuous. The gigantic blocks of basalt called haystack rocks (some of which are larger than a good sized house) were transported by glaciers and dropped in an area known as a terminal moraine, which marks the end of the glaciers' southward journey.

Three physiographic areas influence the geology of Douglas County and the Columbia River: the Columbia Mountain/Highlands to the north, the North Cascade Range to the west and the Columbia Basalt Plain to the east and south. The Columbia River flows over mainly Paleozoic metamorphic and intrusive rocks north of Rock Island Dam, while south of the dam the river passes through the Columbia basalt group. Major landforms include Dyer Hill, Waterville Plateau, Moses Coulee, and the Badger Mountain area.

Soils

The US Department of Agriculture has recognized 16 separate soil types within Douglas County. Along the Columbia River corridor the soils are predominantly sandy and gravely, which, when combined with irrigation, provide an excellent medium for orchards. Except for those found in the coulees and other geologic breaks, the remaining soils are typically a form of silt-loam utilized primarily for dryland row crops.

Vegetation/Land Uses

Vegetation in Douglas County consists mainly of steppe and shrub steppe vegetation interspersed with dryland agriculture and CRP. Forest vegetation is generally confined to the Badger Mountain area and in pockets on steep slopes along the Columbia River. Along the Columbia River below Chief Joseph Dam irrigated agriculture is common. Present vegetative communities vary widely from historic conditions because much of the county is cultivated or grazed by livestock.
Major land uses in include agriculture, livestock grazing, and suburban development. As the human population in the area grows, pressure on natural resources intensifies. There are six incorporated cities within the County; Bridgeport, Coulee Dam, East Wenatchee, Mansfield, Rock Island, and Waterville. Bridgeport, Coulee Dam, East Wenatchee and Rock Island are all located adjacent to the Columbia River.

Water resource development
Five Columbia River dams are located within Douglas County: Chief Joseph, Wells, Rocky Reach, Rock Island, and Wanapum dams. All Columbia River dams, with the exception of Chief Joseph Dam, have upstream fish passage facilities and also provide downstream passage for juvenile salmonids through collection facilities or fish spill. These dams provide an economical power supply and numerous recreational and economic benefits. Grand Coulee Dam is immediately adjacent to Douglas County (in Grant County) although the operations affect Lake Rufus Woods and operations of all hydro-electric facilities below it.

Hydrography
The Columbia River travels about 155 river miles, forming the county's boundary on the north and west. Below Chief Joseph Dam, the Columbia River flows in a westerly direction and turns south at the eastern edge of the Cascade Mountains. Several minor tributaries and drainages join this stretch of the Columbia. These include: Foster, Pine Canyon, Rock Island, and Moses Coulee drainages. Jameson and Grimes Lakes are the largest lakes (coulee lakes) in the county. The two largest watersheds located within the county are Foster Creek (WRIA 50) and Moses Coulee (WRIA 44). Grand Coulee Equalization Reservoir (Banks Lake) and the Sun lakes border the east.

Hydrology
Hydrology in the area primarily reflects a snowmelt system. Generally, snow accumulates in the surrounding areas from November to March, then melts and produces peak runoff during April and May, although the Columbia River peaks in May/June. During late summer and fall, stream flows in tributary streams often decline substantially and remain relatively low through April. Heavy rainfall in late fall or early winter can also lead to increased runoff, and in the past these rain-on-snow events in the eastern Cascades have caused some of the most significant flooding events in the region.

Water quality- Columbia River
The Columbia River has been classified by Ecology as "Class A" water. On a scale ranging from Class AA (extraordinary) to Class C (fair), Class A waters are rated as excellent. State and federal regulations require that Class A waters meet or exceed

certain requirements for all uses. There is still cause for concern. Primary concerns include levels of dissolved gases, changes in stream temperatures, turbidity levels and exposure to environmental contaminates above biological thresholds for fish species utilizing the river. These concerns are generally related to hydropower production, past mining practices, and agriculture. The hydroelectric projects in Douglas County on the Columbia River are “run-of-river” with reservoirs that have little storage capacity. Water velocities are generally fast enough to prevent the formation of a thermocline and the associated depletion of oxygen in deeper waters. Water quality parameters affected by hydropower production include TDG, water temperature, dissolved oxygen, turbidity, suspended sediments and nutrients.

Water uses
Flows in the Columbia River are regulated and managed to provide for hydropower production, flood control, fish passage, irrigation, and other uses. Instream flows for the Columbia River were first established in 1980 under the Instream Resources Protection Program (codified in Chapter 173-563 WAC).

Aquatic/Fish resources
The waters within the lakes, streams and Columbia River support at least 42 species of indigenous and introduced fish. At least five anadromous fish species are found in the Columbia River, including spring, summer/fall Chinook (*Oncorhynchus tshawytscha*), summer steelhead (*O. mykiss*), sockeye salmon *(O. nerka*), Coho salmon (*O. kisutch),* and pacific lamprey (*Lampetra tridentata*). The Columbia River serves as a spawning, rearing and migration corridor to and from the Pacific Ocean each year for adult and juvenile salmon, steelhead, and pacific lamprey. Most fish species however, spawn and rear in tributary streams away from the Columbia River. Fall Chinook salmon spawning has been observed in limited areas in the Columbia River and in the mouth of the Chelan River.

Whitefish, sturgeon, trout, and char were the dominant resident species in the river before reservoir inundation. Bull trout, rainbow, white fish and white sturgeon are currently present in the reservoir along with numerous non-native species. Rainbow trout are present in the mid-Columbia reservoirs; however they are likely the result of hatchery steelhead and resident rainbow trout production programs in nearby tributaries. Resident rainbow trout do not appear to be self-sustaining in the reservoirs, though self-sustaining populations of rainbow, cutthroat, and brook trout are maintained in the tributaries (Chelan County PUD 1998; Zook 1983). It is believed that white sturgeon also spawn in the Columbia River (Chelan County PUD, unpublished data, 2001; Grant County PUD re-licensing documents, 2002).
Hydropower development and production in the mid-Columbia created a subsequent shift in resident species composition toward dominance by cool water non-game species such as sucker, chub, northern pikeminnow, and shiners. Walleye, bass, peamouth, chiselmouth, carp, and perch are also found in the system.

Most of the lakes within Douglas County are of two types, coulee and kettle lakes, but also include the oxbow lakes around the City of Rock Island formed by the Columbia

River. Most of the interior lakes are alkaline, although the two largest lakes support fish (Jameson and Grimes). Jameson is stocked annually by WDFW with rainbow trout and Grimes has Lahontan cutthroat trout. Both lakes have algae blooms. Peter Burgoon, Water Quality Engineering, has been providing assistance to the Douglas County Watershed Planning Association for investigating the algae and water quality concerns. The main concerns have been blue green algae- *Microcystis* capable of producing toxins (mid summer) and the *Oscillatoria* spp. that turns the lakes red in late fall/winter, although the coloration can occur at anytime.

In 2005 the peak *Oscillatoria* at the start of fishing season (end of April) followed by a muddy brown color in July just before the fish kill. The fish kill was caused by low oxygen when the algae count went from 1,200,000 to 300,000 counts/liter in a two week period.

Limiting Factors

A combination of factors has negatively impacted the viability several species within the area. These include, residential development and urbanization, road construction and maintenance, mining, grazing, hydropower development and water diversions, forest management, fish management (hatcheries and harvest regulations); entrainment (process by which aquatic organisms are pulled through a diversion or other device) into diversion channels, and exotic species. The affects of these actions is to degrade and fragment fish and wildlife habitat.

Riparian Condition

Undisturbed riparian systems are rare in the region. Riparian habitat diversity has declined and is undeveloped in some areas, whereas other areas have increased. Low-bank riparian habitat is extremely rare along the river and some areas that were once dominated by cottonwood have been lost. Some of this habitat was lost because of the development of hydropower on the river that altered the natural flood regime. However, in many areas, extremely high flow events prior to installation of the dams scoured what little vegetation there was. Shorelines along the Columbia River now tend to exhibit lake fringe riparian conditions in many areas, not historically present. Other factors, including agricultural conversion and water withdrawals have also impacted riparian systems in the region. As a result, some of the upper middle Columbia now exhibits steep shorelines and sparse riparian vegetation that provide limited fish and wildlife habitat.

Embayments connected to the Columbia River Columbia via culverts, small channels or elevated water tables, provide special wildlife values (e.g. Rock Island Lakes). The reduced water fluctuation and protection from wave action is beneficial to wildlife, directly and indirectly, and as a result those conditions promote diverse riparian and wetland vegetative communities.

Fine Sediment

Smoothing of the hydrograph and lack of significant reservoir fluctuation from Columbia Basin hydroelectric development has increased the amount of fine sediment present in Columbia River cobble substrate, especially in the lower portions of reservoirs.

Columbia River anadromous salmonid spawning is concentrated at the upstream portions of reservoirs, where it is generally assumed river hydraulics are sufficient to maintain well-sorted substrates that are relatively free of fine sediment. Water velocity in the upstream reservoir areas is also sufficient for adult anadromous salmonids to move cobble substrate for redd construction.

Water Quantity and Quality
Columbia River flows average more than 180,000 cubic feet per second (cfs) in the region. Most of this flow comes from upriver areas in the Columbia River Basin. Upriver contributions from the Columbia Basin in Canada provide 99,200 cfs of average flow in the Columbia River, and much of the balance comes from the Kettle and Spokane rivers. Average flow contributions from the three largest tributaries in the area (the Okanogan, Methow and Wenatchee rivers) provide another 7,860 cfs to the Columbia River Columbia River. Hydroelectric operations at Grand Coulee Dam greatly influence river flows for downstream hydroelectric operations.

Agricultural Development
Agricultural development in the region has altered or eliminated approximately one third of the native shrub steppe habitat and fragmented riparian/floodplain habitat. Agricultural operations have increased sediment loads and introduced pesticides and fertilizers into streams, wetlands, and other water bodies. Conversion to agriculture has decreased the overall quantity of habitat for many native species, but disproportionate loss of specific communities, such as deep soil shrub steppe may be particularly critical for certain habitat specialists. The quality of remaining habitat is reduced as fragmentation increases especially for core sensitive species.

Urban and Rural Development
Residential/urban sprawl and rural development have resulted in the loss of large areas of habitat and have increased fragmentation and harassment of wildlife, particularly large areas of habitat that functions as winter refuge for native wildlife. Most of these areas are at low elevations and are along the Columbia River corridor. In addition, the lower Moses Coulee area serves as winter range for several species, primarily mule deer. As the human population continues to grow, urban and rural residential areas continue to spread into once wild areas and agricultural lands that may have been prime habitat for wildlife. Also, proximity to agriculture or suburban development leads to a high density of nest parasites (brown-headed cowbird), exotic nest competitors (European starling), and domestic predators (cats). Disturbance by humans in the form of highway traffic, noise and light pollution, and recreational activities (particularly during nesting season and in high-use recreation areas) also have the potential to displace fish and wildlife and force them to use less desirable habitat. For example, the state highways along both sides of the Columbia River from Wenatchee to Brewster have high rates of automobile accidents involving deer.

While urban areas comprise only a small percentage of the land base within the county, their habitat impacts are significant. Cities and towns within the region are largely built along streams and rivers. Channelization and development along streams has

eliminated riparian and wetland habitats. Expansion of urban areas creates stormwater drainage, and homes built along streams have affected both water quality and the ability of the floodplain to function normally. Removal of woody, overhanging vegetation along some of the stream corridors may have increased stream temperatures to the point that they are unable to support coldwater biota. In addition, mowing, burning, and tillage of developed uplands removes habitat for upland nesting birds such as red-winged blackbird and gadwall.

Rural development patterns are also a great concern for fish, wildlife, and their habitats. Several areas have had land subdivided into lots small enough that fragmentation, noxious weeds, continuous disturbance by domestic animals, and similar issues are having negative impacts. One example of that is along the Columbia River where shoreline development is occurring in many places and is at high risk of negatively affecting fish and wildlife on both sides of the river from Chief Joseph Dam to Wanapum Dam. Shoreline development in this area is likely to affect migrating birds and water quality, and it separates the shore from the uplands for terrestrial species.

Exotic Species

The spread of non-native plant and wildlife species poses a threat to wildlife habitat quality and to fish and wildlife species. Noxious weeds (e.g., cheatgrass, thread-leaved sedge, diffuse knapweed, Dalmatian toadflax, reed canary grass, purple loosestrife, perennial pepperweed, Russian knapweed, Canada thistle, Russian olive, etc.) can threaten the abundance of native wetland and upland plant species utilized by wildlife. For example, Eurasian water milfoil surveys conducted by the CCPUD during the mid 1980s found that milfoil is infiltrating native aquatic plant beds and displacing these native plant species (NPCC 2002). Knapweed and Dalmatian toadflax are two target species of plants that several agricultural programs work to retard along roads and in shrub steppe areas. Exotic fish and wildlife species (e.g., carp, European starling, walleye, and smallmouth bass) can compete with native fish and wildlife for resources, potentially leading to the decline of the native species. For example, carp within a wetland disturb submergent vegetation and destroy habitat for emergent aquatic insects and thus affect the productivity of the wetland.

Terrestrial / Wildlife resources

There are an estimated 349 wildlife species that likely occur in the county (NPCC, 2003). Of these species, 111 (31%) are closely associated with riparian and wetland habitat and 74 (21%) consume salmonids during some portion of their life cycle. Three wildlife species that occur in the area are listed federally and 30 species are listed in Washington as Threatened, Endangered, or Candidate species. A total of 98 bird species are listed as Washington or Idaho State Partners in Flight priority and focal species. A total of 50 wildlife species are managed as game species in Washington.

Habitat Types

Douglas County has 10 wildlife habitat types, which are briefly described in the table below. Detailed descriptions of these habitat types can be found in Appendix B of

Ashley and Stovall (unpub. rpt., 2004). Much of this section comes whole or part from their report.
Dramatic changes in wildlife habitat have occurred throughout the region since pre-European settlement (circa 1850). The most significant habitat losses include the loss of 39 percent of shrub steppe habitat.

Wildlife habitat types within the region (IBIS, 2003).

Habitat Type	Brief Description
Eastside (Interior) Mixed Conifer Forest	Coniferous forests and woodlands, Douglas-fir commonly present, up to 8 other conifer species present, understory shrub and grass/forb layers typical, mid-montane.
Ponderosa Pine Woodland	Ponderosa pine dominated woodland or savannah, often with Douglas-fir; shrub, forb, or grass understory; lower elevation forest above steppe, shrub steppe.
Upland Aspen Forest	Quaking aspen (*Populus tremuloides*) is the characteristic and dominant tree in this habitat. Scattered ponderosa pine (Pinus ponderosa) or Douglas-fir (Pseudotsuga menziesii) may be present.
Eastside (Interior) Grasslands	Dominated by short to medium height native bunchgrass with forbs, cryptogam crust.
Shrub steppe	Sagebrush and/or bitterbrush dominated; bunchgrass understory with forbs, cryptogam crust.
Agriculture, Pasture, and Mixed Environs	Cropland, orchards, vineyards, nurseries, pastures, and grasslands modified by heavy grazing; associated structures.
Urban and Mixed Environs	High, medium, and low (10-29 percent impervious ground) density development.
Open Water – Lakes, Rivers, and Streams	Lakes, are typically adjacent to Herbaceous Wetlands, while rivers and streams typically adjoin Eastside Riparian Wetlands and Herbaceous Wetlands
Herbaceous Wetlands	Generally a mix of emergent herbaceous plants with a grass-like life form (graminoids). Various grasses or grass-like plants dominate or co-dominate these habitats.
Eastside (Interior) Riparian Wetlands	Shrublands, woodlands and forest, less commonly grasslands, often multi-layered canopy with shrubs, graminoids, forbs below.

Shrub steppe occurred primarily in the eastern areas of the region and included three shrub-dominated steppe vegetation zones: three-tipped sage, central arid and big sage/fescue (Cassidy 1997).

Sage sparrows, Brewer's sparrows, sage thrashers, and sage grouse are considered shrub steppe obligates, and numerous other species are associated primarily with shrub steppe at a regional scale. In a recent analysis of birds at risk within the interior Columbia Basin, the majority of species identified as of high management concern were shrub steppe species. Over half of these species have experienced long-term population declines (Saab and Rich 1997).

Eastside (Interior) Riparian Wetlands
Prior to 1850, riparian habitats were found at all elevations and on all stream gradients; they were the lifeblood for most wildlife species with up to 80 percent of all wildlife species dependent upon these areas at some time in their lifecycle (Thomas 1979).

Many riparian habitats were maintained by beaver activity which was prominent throughout the west. Beaver-dammed streams created pools that harbored fish and other species; their dams also reduced flooding and diversified and broadened the riparian habitat. The other important ecological process which affected riparian areas was natural flooding that redistributed sediments and established new sites for riparian vegetation to become established.

Riparian vegetation was restricted in the arid Intermountain West, but was nonetheless fairly diverse. It was characterized by a mosaic of plant communities occurring at irregular intervals along streams and dominated singularly or in some combination by grass-forbs, shrub thickets, and mature forests with tall deciduous trees. Common shrubs and trees in riparian zones included several species of willows, red-osier dogwood, hackberry, mountain alder, Wood's rose, snowberry, currant, black cottonwood, water birch, paper birch, aspen, peachleaf willow, and mountain alder. Herbaceous understories were very diverse, but typically included several species of sedges along with many dicot species.

Riparian areas have been extensively impacted within the Columbia Plateau such that undisturbed riparian systems are rare (Knutson and Naef 1997). Impacts have been greatest at low elevations and in valleys where agricultural conversion, altered stream channel morphology, and water withdrawal have played significant roles in changing the character of streams and associated riparian areas. Losses in lower elevations include large areas once dominated by cottonwoods that contributed considerable structure to riparian habitats. In higher elevations, stream degradation occurred with the trapping of beaver in the early 1800s, which began the gradual unraveling of stream function that was greatly accelerated with the introduction of livestock grazing. Woody vegetation has been extensively suppressed by grazing in some areas, many of which continue to be grazed. Herbaceous vegetation has also been highly altered with the introduction of Kentucky bluegrass that has spread to many riparian areas, forming a sod at the exclusion of other herbaceous species. The implications of riparian area degradation and alteration are wide ranging for bird populations which utilize these habitats for nesting, foraging and resting. Secondary effects which have impacted insect fauna have reduced or altered potential foods for birds as well.

Within the past 100 years, an estimated 95 percent of this habitat has been altered, degraded, or destroyed by a wide range of human activities including river channelization, unmanaged livestock grazing, clearing for agriculture, water impoundments, urbanization, timber harvest, exotic plant invasion, recreational impacts, groundwater pumping, and fire (Krueper Unknown). Together, these activities have dramatically altered the structural and functional integrity of western riparian habitats (Johnson *et al.* 1977; Dobyns 1981; Bock *et al.* 1993; Krueper 1993; Fleischner 1994; Horning 1994; Ohmart 1994, 1995; Cooperrider and Wilcove 1995; Krueper 1996). At present, natural riparian communities persist only as isolated remnants of once vast, interconnected webs of rivers, streams, marshes, and vegetated washes.
Quigley and Arbelbide (1997) concluded that the cottonwood-willow cover type covers significantly less in area now than before 1900 in the Inland Pacific Northwest. The

authors concluded that although riparian shrubland occupied only 2 percent of the landscape, they estimated it to have declined to 0.5 percent of the landscape. Approximately 40 percent of riparian shrublands occurred above 3,280 feet msl prior to 1900; now nearly 80 percent is found above that elevation. This change reflects losses to agricultural development, road development, dams, and other flood-control activities. The current riparian shrublands contain many exotic plant species and generally are less productive than historically. Quigley and Arbelbide (1997) found that riparian woodland was always rare and the change in extent from the past is substantial.

The Northwest Habitat Institute (NHI) riparian habitat data are incomplete; therefore, riparian floodplain habitats are not well represented on NHI maps (accurate habitat type maps, especially those detailing riparian/wetland habitats, are needed to improve assessment quality and support management strategies/actions). Subbasin wildlife managers, however, believe that significant physical and functional losses have occurred to these important riparian habitats from hydroelectric facility construction and inundation, agricultural development, and livestock grazing.
Riparian wetland habitat dominated by woody plants is found throughout eastern Washington. Mountain alder-willow riparian shrublands are major habitats in the forested zones of eastern Washington. Eastside lowland willow and other riparian shrublands are the major riparian types throughout eastern Washington at lower elevations. Black cottonwood riparian habitats occur throughout eastern Washington at low to middle elevations. Quaking aspen wetlands and riparian habitats are widespread but rarely a major component throughout eastern Washington. Ponderosa pine-Douglas-fir riparian habitat occurs only around the periphery of the Columbia Basin in Washington and up into lower montane forests.

Riparian wetland habitat appears along perennial and intermittent rivers and streams. This habitat also appears in impounded wetlands and along lakes and ponds. Their associated streams flow along low to high gradients. The riparian and wetland forests are usually in fairly narrow bands along the moving water that follows a corridor along montane or valley streams. The most typical stand is limited to 100-200 feet from streams. Riparian forests also appear on sites subject to temporary flooding during spring runoff. Irrigation of stream sides and toe slopes provides more water than precipitation and is important in the development of this habitat, particularly in drier climatic regions. Hydro-geomorphic surfaces along streams supporting this habitat have seasonally to temporarily flooded hydrologic regimes. Eastside riparian wetland habitats are found from 100 to 9,500 feet in elevation.

Eastside riparian wetland habitat occurs along streams, seeps, and lakes within the eastside mixed conifer forest, ponderosa pine forest and woodlands, western juniper and mountain Mahogany woodlands, and part of the shrub steppe habitat. This habitat may be described as occupying warm montane and adjacent valley and plain riparian environments.
Eastside riparian wetland habitat structure includes shrublands, woodlands, and forest communities. Stands are closed to open canopies and often multi-layered. A typical riparian habitat would be a mosaic of forest, woodland, and shrubland patches along a

stream course. The tree layer can be dominated by broadleaf, conifer, or mixed canopies. Tall shrub layers, with and without trees, are deciduous and often nearly completely closed thickets. These woody riparian habitats have an undergrowth of low shrubs or dense patches of grasses, sedges, or forbs. Tall shrub communities (20-98 feet, occasionally tall enough to be considered woodlands or forests) can be interspersed with sedge meadows or moist, forb-rich grasslands. Intermittently flooded riparian habitat has ground cover composed of steppe grasses and forbs. Rocks and boulders may be a prominent feature in this habitat.

Herbaceous Wetlands

According to the Interactive Biodiversity Information System (IBIS) database (2003), there are an estimated 3,514 acres of herbaceous wetland habitat currently in the Subbasin, which is an underestimate while an analysis of National Wetlands Inventory NWI data (Publication FWS 1999-0518) estimated 6,032 acres. Subbasin planners relied on a combination of data sources to depict current herbaceous wetlands distribution in the subbasin. Although there are no historic data to make comparisons, the actual number of acres or absolute magnitude of the change is less important than recognizing a loss of herbaceous wetlands habitat has occurred and the lack of permanent protection continues to place this habitat type at further risk.

Habitat Structure and Composition

Physical

Herbaceous wetlands include depressional wetlands of two basic types: lacustrine and palustrine (i.e., around lakes/ponds and swampy areas). This habitat is found on permanently flooded sites that are usually associated with oxbow lakes, dune lakes, or potholes. Seasonally to semi-permanently flooded wetlands are found where standing freshwater is present through part of the growing season and the soils stay saturated throughout the season. In the Columbia Basin, many of the herbaceous wetlands lie in topographic depressions that are not within the active channel of a stream or river. Wetlands in an active channel or that are frequently flooded (at least once every two years) are classified as “riverine”. Depressional wetlands are located in the channeled scablands, wind blown loess and sand dunes, glacial kettles or potholes, and alluvial and basalt terraces, particularly along the Columbia River (Hruby and Stanley 2000).

Herbaceous wetlands are also classified as either alkali or freshwater wetlands. Alkali wetlands are not as common on the landscape as freshwater wetlands in the Columbia Basin, but they do provide some unique habitat features. The ecological processes in these wetlands are dominated by the high salt concentrations in the water. The most visible result of the salt is a unique set of plants that have adapted to these conditions. Only a few species have adapted to these conditions and the species richness in alkali systems is much lower than in freshwater systems. Although richness may be low, abundance can be very high for those species that have adapted (especially among some invertebrates) (Hruby and Stanley 2000).

Depressional freshwater wetlands are defined as those whose conductivity is consistently below 2000 µSiemens/cm. The water regime in non-alkali wetlands tends to

be dominated by surface runoff or groundwater in areas where inflow exceeds water losses through evaporation or evapo-transpiration.

Herbaceous wetland habitat is maintained through a variety of hydrologic regimes that limit or exclude invasion by large woody plants. Habitats are permanently flooded, semi-permanently flooded, or flooded seasonally and may remain saturated through most of the growing season. Most wetlands are resistant to fire and those that are dry enough to burn usually burn in the fall. Most plants are sprouting species and recover quickly. Beavers play an important role in creating ponds and other impoundments in this habitat. Trampling and grazing by large native mammals is a natural process that creates habitat patches and influences tree invasion and success (IBIS 2003).

During years with adequate precipitation, wetlands in Grant, Douglas, Okanogan, and Lincoln counties support the most productive and diverse waterfowl breeding communities in the Pacific Northwest. Grasslands and shrub steppe habitats surrounding these wetlands provide habitat for upland nesting ducks. The Columbia Basin Irrigation Project has created numerous wetlands that are more persistent but less productive for breeding waterfowl as a result of wetland succession and invasion by exotic, undesirable vegetation. The crops that are grown in this Subbasin, in concert with large reservoirs, wetlands, canals, and wasteways provide ideal conditions for many species of migrating and wintering waterfowl (Quinn 2001).

Vegetative

The herbaceous wetland habitat is generally a mix of emergent herbaceous plants with a grass-like life form (graminoids). Various grasses or grass-like plants dominate or co-dominate these habitats. Cattails (*Typha latifolia*) occur widely, sometimes adjacent to open water with aquatic bed plants. Several bulrush species (*Scirpus acutus, S. tabernaemontani, S. maritimus, S. americanus*, *S. nevadensis*) occur in nearly pure stands or in mosaics with cattails or sedges (*Carex* spp.). These meadows often occur with deep or shallow water habitats with floating or rooting aquatic forbs. Herbaceous cover is open to dense. The habitat can be comprised of tule marshes >6.6 ft (2 m) tall or sedge meadows and wetlands <3.3 ft (1 m) tall. Shrubs or trees are not a common part of this herbaceous habitat although willow (*Salix* spp.) or other woody plants occasionally occur along margins. Important introduced grasses that increase and can dominate with disturbance in this wetland habitat include reed canary grass (*Phalaris arundinacea*), tall fescue (*Festuca arundinacea)* and Kentucky bluegrass (*Poa pratensis*) (IBIS 2003).

Many plants found in alkali systems are unique such as *Distichlis spicata, Scirpus maritimus* or *Scirpus americanu*s. These plants tend to be sparse and relatively short (<1m). As a result, alkali systems often have extensive mudflats and meadows of short grass that attract certain species of waterfowl and shorebirds. Alkali wetlands provide critical habitat for many species of migratory birds (Hruby and Stanley 2000).

Fresh water wetlands with water present greater than nine months typically have a ring of bulrush *(Scirpus spp*.) or cattails *(Typha spp*.) around an area of open water (or mudflats in very dry years). White water buttercup *(Ranunculus aquatili*s), burreed

(Sparganium emersum), American water-plaintain *(Alisma plantago-aquatica*), or American water-plaintain *(Alisma plantago-aquatic*a) can also be present (Hruby and Stanley 2000).

Herbaceous wetlands are often in a mosaic with shrub- or tree-dominated wetland habitat. Woody species can successfully invade emergent wetlands when this herbaceous habitat dries. Emergent wetland plants invade open-water habitat as soil substrate is exposed; e.g., aquatic sedge and Northwest Territory sedge (*Carex utriculata*) are pioneers following beaver dam breaks. As habitats flood, woody species decrease to patches on higher substrate (soil, organic matter, and large woody debris) and emergent plants increase unless the flooding is permanent. Fire suppression can lead to woody species invasion in drier herbaceous wetland habitats (IBIS 2003).

A.2 Data inventory and materials

The inventory is a compilation of all pertinent and available data, plans, studies, inventories, and other applicable information. Existing reports, information, aerial photos and GIS data were thoroughly evaluated (see characterization for details). Working inventory maps were created at the appropriate scale for analysis for use by the technical group to assist with decisions on reach breaks, data inclusion or exclusion, assumptions, and other related planning.

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USGS, 2003. Higgins, Johnna L. Determination of Upstream Boundary Points on Southeastern Washington Streams and Rivers Under the Requirements of the Shoreline Management Act of 1971. Prepared in cooperation with the Washington Department of Ecology, Tacoma, Washington. Water-Resources Investigations Report 03-4042.

A.3 Characterization

Characterization - The following information was collected and mapped in GIS:

1. Shoreline and adjacent land use patterns, transportation, and utility facilities, including the extent of existing structures, impervious surfaces, vegetation and shoreline modifications in shoreline jurisdiction.
2. Critical areas, including wetlands, aquifer recharge areas, fish and wildlife conservation areas, geologically hazardous areas, frequently flooded areas, and shorelines of statewide significance.
3. Degraded areas and sites with potential for ecological restoration. Criteria for selection of these sites will be assembled in conjunction with Douglas County staff and the technical committee.

4. Areas of special interest, such as priority habitats, rapidly developing waterfronts, previously identified toxic or hazardous material clean-up sites, or eroding shorelines.
5. Existing and potential shoreline public access sites, including public rights-of-way and utility corridors.
6. Conditions and regulations in shore lands and adjacent areas that affect shorelines, such as surface water management and land use regulations.

GIS information sources:
Chelan Public Utility District- erosion, aquatic plan and rare plant surveys.
Grant Public Utility District- erosion, habitat inventory
Washington Department of Ecology- Rivers, streams and lakes under shoreline jurisdiction
Washington Department of Fish and Wildlife- Priority Habitat and Species datasets
Farm Services Agency- digital aerial photos, 2004 and 1947
Douglas County- 1994 digital aerial photo, parcel layer, urban growth areas, roads
US Fish and Wildlife Service- National Wetlands Inventory (NWI)
NRCS- Douglas County soils inventory

Some errors were corrected with discussion with the Corps of Engineers for public access and right or way/easement information on Lake Rufus Woods (personal comm. Jan 2006).

The process began by using two bands of buffers, 200 feet wide (total of 400 feet). Fields were added as needs were identified, which are described below. Many of these can be mapped with legends, where as some add additional information for analyzing specific areas in a view (ArcView). Data has been summarized and entered into an Excel spreadsheet.

Fields in the table:

Composition	Attribute	Condition
Up_shore_a	Geohaz	Zoning
Jurisdicti	Reach	UGA
Pool	Soil	Habitat_qu
Develop_pr	NWI_match	Notes
Musym	Mukey	Area_Feet
Perimeter_Feet	Acres	

Environment Designations determined at the middle or end of the SMP process will be a separate GIS shapefile. The order above is how the table looks now- fields can be moved around or renamed, subject to length limitations.

Composition Categories

Bare	Building	Cliff
Cultural Feature	Dam	Dock
Dryland Ag	Gravel Road	Gravel/sand

Industrial	Irrigated Ag	Irrigation Return?
Island	Parking Lot	Ponderosa pine/Shrub steppe
Railroad	Ramp	Riparian
Road	Rock	Rock/Shrub steppe
Rock/gravel	Sand	Sand/gravel
Shrub steppe	Trees/shrubs	Utilities
Wastewater Treatment	Water	Water Pipeline
Wetland	Yard	

Gross level similarities of the categories were used to assist with reach identification with other fields as noted.

Wetlands limitation- the data was created using aerial photos, so they may not be "officially" wetlands because the soils were not tested. We did use NWI after creating to make sure what was in that dataset was covered. Recall the USFWS was using a much coarser level of digitizing than we did (scale), so we likely caught more than they did, particularly along the Columbia River. The Douglas County soils layer is not at a fine enough scale to have wetland soils types determined in most cases.

Attribute and Condition reflect additional information that can assist the user with details, such as road name or paved. In some cases areas were added here as well, such as Sun Cove or Daroga State Park- see separate spreadsheet for the list.

Up_shore_a- a label field for upland, shoreline (jurisdiction), water front, aquatic (water), island or in water structure. Water Front was used to distinguish polygons that actually are touching the water body. Island has a second (actual) habitat listed in the attribute field.

Geohaz- since the soils layer was spliced in, the current CAO layer for soils in Douglas County was used to address this component- Y/N value.

Jurisdiction and UGA fields- county, city limits and UGAs added as fields (Jurisdiction and UGA). Jurisdiction has 5 listings (4 cities and County). In the UGA field UGA, City Limits and Rural were used. The UGAs and City Limits have the appropriate name. Total of 7 since Bridgeport and Coulee Dam UGAs are essentially the same as the city limits.

Reach- identification on the Columbia River pool to pool (i.e. Rock Island 1, Rock Island 2 etc.), and interior lakes as determined by attributes in the inventory (development, agriculture, natural features etc.).

Pool- the five pools on the Columbia River- Wanapum, Rock Island, Rocky Reach, Wells, and Lake Rufus Woods. Used to assist with reach identification.

Soil- the Douglas County soils layer was “spliced” into the shoreline layer, thereby doubling the number of records. The name, soil number (musym), and key field (mukey) were added. The key field allows joining related datasets from NRCS to the records.

Habitat_qu- habitat quality- note that there a five fields total for habitat attributes. This section is intended to address the following elements in WAC 173.206.201: (2)c, (3)c.ii, (3)c.iv, (3)d.i.A.II, (3)d.i.C, and (3)d.i.D. These elements consider habitat for aquatic, shoreline-dependent and upland (shrub steppe) birds, invertebrates, mammals and amphibians.

Development_pr- this is a broad “potential for development” field based on zoning, parcel sizes and access. There are a three of areas where ownership was considered- below Rock Island Dam (LLC [increase potential] and U.S. ownerships [lower potential]), East Wenatchee area (WSDOT ownership) and in the Wells pool (DCPUD ownership lowers the potential). Existing structures were labeled as high (see maps).

NWI_match- does the drawn polygon coincide with the National Wetland Inventory (Y/N answer)?

Notes- again additional information, for example, lake names were added to all the polygons around a lake in this field.

The criteria include consideration for roads, vertical and horizontal direction of habitat use and function (i.e. along the shoreline or perpendicular to the shoreline), and diversity of habitats. The measures and distances were derived from a variety of sources and local conditions, such as the steep slopes that separate the types of land uses immediately above the Columbia River and the interior plateau. These criteria were developed by the technical review team- Alliance Consulting Group, Douglas County, Washington Department of Fish and Wildlife and Department of Ecology, Douglas, Chelan and Grant County PUD’s.

Criteria	**Measure**	**High functioning**	**Medium functioning**	**Low functioning**
Roads	Distance to habitat	1.0 mile or more	0.1-0.9 miles	< 0.1 miles
Continuous/ connectivity	Depth upland	> 2 miles unbroken	1-2 miles unbroken	< 1 mile unbroken
Corridor- linear along the shoreline	Continuous natural feature along shore.	>2 miles	0.5-2 miles	< 0.5 miles
Critical habitat features (PHS)	Single or multiple habitat types- adjacency	3 or more habitat types clustered	2 habitat types clustered	1 habitat type- no cluster

For each category points were assigned to the level of function: High functioning -3, Medium functioning 2, Low functioning 1. The points were then multiplied for each criterion to get a qualitative numerical value. For example if roads were low functioning (1), Continuous connectivity a (2), Corridor (3) and Critical habitat types (2) then the resulting score would be 12 (1x2x3x2). This gives a final number that can distinguish some level of biodiversity. It does not consider special circumstances, such as alkaline lakes, which can have a high density or organisms, but is limited in the number of different species (species richness). This particular analysis is just one of several to consider in the shoreline review process.

A second habitat analysis, using the same parameters, used a different calculation for the habitat values was completed late in the RSMP update. The values were added together for the four functions and divided by four. So using the previous example above (1+2+3+2) and dividing by four the result is two (2). The range of values is zero to four, instead of zero to 81 (see section A.4.). The results of this analysis are not discussed or summarized in the text below because of time constraints, but can be found in Appendix E. Tables. The results do not appear to be significantly different, but give a more balanced comparison of the reaches. This analysis, and using the first calculation, was also applied to the environment designations, also in Appendix E, to compare types of designations with the habitat value. Comparing the two the additive formula (second analysis) appears to give an overall better judgment on the value of the habitat.

Critical habitat features- habitat types in PHS.

Cliff	Talus	Cottonwood Groves (tree component)
Riparian	Wetlands	
Shrub steppe	Island	

Aquatic beds, aspen stands and caves were considered, but no inventory of these types was available during analysis. Ability to depict from aerial photos was not possible as well. Cottonwood groves were considered and while hard to detect species, in most cases a deciduous tree component was visible via aerial photographs and considered to consist mostly of cottonwoods, or trees having some similar functions. Individual trees (not in clumps) were not separated in the inventory.

References specific to this section.

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A.4 Analysis- reaches

Reaches are areas along a shoreline with similar characteristics that are separated from other areas that are distinctly different. The reaches created a course level that may or may not be the same as the environment designation; environment designations are a finer level of detail, typically smaller in area or length. The reaches were developed to assist with developing environment designations, describe environmental conditions and assist with restoration planning for the SMP.

For all reaches please refer to tables for specific details on wetland types. The types were derived from the National Wetlands Inventory (NWI) categorizations, and not on wetland typing. No soil surveys were done on any wetland. Zoning, parcel and public land information was derived from existing data from the cities and county GIS datasets and matched to the 200 foot shoreline jurisdictional boundary. Habitat numbers should be considered in the overall range of values using the minimum, maximum, mean and median values listed below. The format below begins with the Columbia River and follows with the interior lakes in alphabetical order.

Habitat values
Minimum= 0
Maximum= 81
Mean= 18.0
Median= 6.6

Additionally, the reach review included evaluating Washington Department of Fish and Wildlife Priority Habitat and Species data. The data has point and polygon data. The point data is summarized by number of species and points found on or adjacent to the shorelines. The polygon data is summarized by numbers and types of habitat mapped within 400 feet of the shoreline. The acres are listed as well, but many overlap, therefore the interpretation should be as a relative indicator. It should be noted that some of the information is mapped better in some areas than others, for example on the Wanapum pool there are no points in Douglas County near the shoreline except right at

Rock Island Dam, although there is no doubt there are species using habitat in that area.

Columbia River reaches starting at the southern most area of the County (Crescent Bar) and moving north and east to Grand Coulee Dam.

Wanapum 1
This reach begins at the southern Douglas County line and extends westerly for approximately 1 mile, and contains 44 acres. With the exception of a home site at the very beginning of the reach, the shoreline is in a relatively natural state with an unusual wetland/cliff habitat area in the center. There are six wetland types (NWI) in the reach. The habitat rating average of 4.9 is due to limited vertical and horizontal corridor functions (barriers) and proximity to a major road. The majority of the area is shrub steppe and has steep slopes, and 98% soils of a geologic hazard as defined under the Douglas County Code (DCC). The uplands are primarily in steep shrub steppe mixed with some houses, then irrigated and dryland agriculture followed by the plateau with shrub steppe and dryland agricultural uses. The area is zoned as Rural Recreation, and partially under a Planned Residential Development overlay. The average parcel size is 5.1 acres, with 20 acres of public lands that are located on the shoreline (GCPUD). Impervious surfaces cover 0.6% of the area. Given the slope, ownership, and five priority habitats, the habitat from the waterward side probably has a higher value to wildlife than the rating would indicate.

Polygon Species Habitat	**Acres**
Chukar	33.8
Mule Deer	33.8

Wanapum 2
This reach begins at the Columbia Cliffs development and extends westerly for approximately 0.6 miles, and contains 27.3 acres. The shoreline is in a state of relatively urban level development (35 buildings within 200 feet) and shoreline alterations. There have been rock/earthen piers built, with two boat docks and a launch site. There are five wetland types (NWI) in the reach. The habitat rating average of 0.6 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number of roads. The uplands are primarily in steep shrub steppe mixed with some houses, then irrigated and dryland agriculture followed by the plateau with shrub steppe and dryland agricultural uses. The majority of the area is developed recreational housing and yards, and 95% soils of a geologic hazard as defined under the DCC. The area is zoned as Rural Recreation, and partially under a Planned Residential Development overlay. The average parcel size is 5.5 acres, with 7.4 acres of public lands that are located on the shoreline (GCPUD). Impervious surfaces cover 11.5% of the area.

Polygon Species Habitat	Acres
Chukar	22.5
Common Loon	0.3
Mule Deer	22.5
Waterfowl Concentrations	0.1

Wanapum 3
This reach begins at the western end of the Columbia Cliffs development and extends westerly for approximately 2.1 miles, and contains 95.4 acres. There are no buildings within the shoreline and the shoreline is in a relatively natural state with some sandy escarpments in the eastern section. There are six wetland types (NWI) in the reach. The habitat rating average of 15.6 is due to the gravel roads, although use is likely limited (primitive, single lane, natural surface roads) and the railroad and State Highway 28 occurring in the uplands. The majority of the area is shrub steppe and has steep to moderate slopes, and 80% soils of a geologic hazard as defined under the Douglas County Code (DCC). The uplands are primarily in irrigated agriculture followed by cliff/talus and then by the plateau with shrub steppe and dryland agricultural uses. The area is almost entirely zoned as Rural Resource 20. The average parcel size is 22.7 acres, with 47.6 acres of public lands that are located on the shoreline (GCPUD). Impervious surfaces cover 1.7% of the area. Given the slope, ownership, four priority habitats, relative isolation and the length of riparian along the western half of the reach, the habitat from the waterward side probably has a higher value to wildlife than the rating would indicate.

Polygon Species Habitat	Acres
Chukar	20.3
Common Loon	0.3
Mule Deer	20.3
Waterfowl Concentrations	0.3

Wanapum 4
This reach begins at river mile (RM) 444.9 of the Columbia River and extends northerly for approximately 2.5 miles, and contains 110.1 acres. There is one building, probably an irrigation pump house, within the shoreline and the shoreline is in a relatively natural state with some gravel roads and what appears to be an un-permitted boat ramp (gravel). There are six wetland types (NWI) in the reach. The habitat rating average of

10.4 is due to the gravel roads, although most of them likely have limited use (primitive, single lane, natural surface roads) and the railroad and State Highway 28 occurring in the uplands. The majority of the area is shrub steppe and has moderate slopes, and 64% soils of a geologic hazard as defined under the Douglas County Code (DCC). The uplands are primarily in irrigated agriculture followed by cliff/talus and then by the plateau with shrub steppe and dryland agricultural uses. Wetlands comprise approximately 10% of the area. There is one larger island (just under 1 acre) in the middle of the reach. The area is almost entirely zoned as Commercial Agriculture 10, with less than 5% Rural Resource 20. The average parcel size is 114.2 acres, with 57.6 acres of public lands. Impervious surfaces cover 7.9% of the area.

Polygon Species Habitat	**Acres**
Common Loon	0.7
Waterfowl Concentrations	0.7

Wanapum 5
This reach begins at RM 447.4 of the Columbia River and extends northerly for approximately 2.1 miles, and contains 93.1 acres. There are no buildings, but there are utilities (high tensile electric lines) and in the central section railroad within the shoreline. There are some gravel roads and the mouth of Moses Coulee drains through this reach. There are six wetland types (NWI) in the reach. The habitat rating average of 5.4 is due to the gravel roads, although most of them likely have limited use (primitive, single lane, natural surface roads) and the railroad occurring in the shoreline area. The majority of the area is shrub steppe and has moderate slopes, and 43.5% soils of a geologic hazard as defined under the Douglas County Code (DCC). The uplands are primarily in irrigated agriculture followed by cliff/talus and then by the plateau with shrub steppe and dryland agricultural uses. Wetlands comprise approximately 15% of the area. There area several small islands that occur in the reach. Given the six priority habitats, and some protection limiting access via the railroad, the habitat from the waterward side probably has a higher value to wildlife than the rating would indicate. The area is almost entirely zoned as Commercial Agriculture 10, with less than 1% Rural Resource 20. The average parcel size is 229.9 acres, with 2.6 acres of public lands. Impervious surfaces cover 11.9% of the area.

No WDFW PHS data for this reach.

Wanapum 6
This reach begins at RM 449.5 of the Columbia River and extends northerly for approximately 2.8 miles, and contains 155.7 acres. There are no buildings, but there are utilities (high tensile electric lines) and in the central section railroad within the shoreline and some buildings just outside of the 200 foot area. There are some gravel roads through this reach. There are six wetland types (NWI) in the reach, and total wetland area is about 10%. The habitat rating average of 5.2 is due to the gravel roads, although

most of them likely have limited use (primitive, single lane, natural surface roads) and the railroad occurring in the shoreline area. The majority of the area is shrub steppe and has moderate slopes, and 34.5% soils of a geologic hazard as defined under the Douglas County Code (DCC). The uplands are primarily in irrigated agriculture followed by cliff/talus and then by the plateau with shrub steppe and dryland agricultural uses. There area several small islands and one large island, sand bar composition that is less than 15 acres, in the middle of the reach. The area is zoned as Commercial Agriculture 10 (50%), and Rural Resource 20. The average parcel size is 86.2 acres, with 52.8 acres of public lands. Impervious surfaces cover 10.7% of the area.

Polygon Species Habitat	**Acres**
Islands	5.2
Mule Deer	0.1
Riparian Zones	14.1

Wanapum 7
This reach begins at RM 452.3 and extends northerly for approximately 1.1 miles ending at Rock Island Dam, and contains 66.1 acres. The shoreline is in almost completely altered as the railroad, old highway right of way and State Hwy 28 are adjacent to the river (an abundance of armoring). There are five wetland types (NWI) in the reach. The habitat rating average of 2.9 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number of roads/railroad. The soils are comprised of 95% geologic hazard as defined under the DCC. The uplands are primarily in cliff/talus followed by the plateau with shrub steppe and dryland agricultural uses. The area is zoned as Rural Resource 20. The average parcel size is 120.2 acres, with 66.1 acres of public lands (or railroad) that are located on the shoreline- the entire area (CCPUD and WSDOT). Impervious surfaces cover 40.1% of the area (road, railroad and armor).

Polygon Species Habitat	**Acres**
Chukar	17.4
Mule Deer	17.4
Riparian Zones	0.2
Talus Slopes	17.4

PHS Points- one Golden Eagle nesting site.

Rock Island 1
This reach begins at Rock Island Dam, RM 453.4, extends westerly for approximately 2.5 miles, and contains 128.7 acres. The shoreline is in almost completely altered as the dam, railroad and State Hwy 28 are adjacent to the river (an abundance of armoring), although the northern portion contains extensive wetlands, 34% of the total area. The structures have created wetlands both isolated and connected to the Columbia River. There are six wetland types (NWI) in the reach. The habitat rating average of 17 is due to the amount of wetland habitat, vertical and horizontal corridor functions above the dam affected area and other priority habitat types. Russian olive makes up a significant portion of the wetland plant community. The soils are comprised of 25% geologic hazard as defined under the DCC. The uplands are primarily in shrub steppe and cliff/talus followed by the plateau with dryland agricultural uses. Rock Island Creek enters this reach approximately at the midpoint. The area is predominantly zoned Rural Resource 20 (47%) and Commercial Agriculture 10 (24%), with some Public and Residential Low designated areas. The average parcel size is 24.3 acres, with 111.5 acres of public lands. Impervious surfaces cover 25% of the area (includes the dam).

Polygon Species Habitat	**Acres**
Bald Eagle	57.3
Great Blue Heron	1.2
Islands	12.5
Riparian Zones	53.6
Waterfowl Concentrations	3.7
Wetlands	12

PHS Points- one Blue Heron- colony nesting on islands

Rock Island 2
This reach begins at RM 455.9, extends westerly for approximately 1.2 miles, and contains 67.7 acres. There are five wetland types (NWI) in the reach. The habitat rating average of 4.9 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number of roads/railroad. The soils are comprised of 22% geologic hazard as defined under the DCC. The area is predominantly zoned Industrial (78%) with some Public and Rural Resource 2 designated areas. This reach is completely within the Rock Island Urban Growth Area, has the railroad crossing and three high tensile wire bundles across the Columbia River at it's western edge. The uplands are primarily in residential development and industrial areas that breaks up to steep slopes followed by a terrace with dryland and irrigated agricultural uses. The average parcel size is 13.4 acres, with 11.3 acres of public lands. This reach has both

Douglas County and City of Rock Island jurisdictional areas. Impervious surfaces cover 6.1% of the area.

Polygon Species Habitat	Acres
Bald Eagle	0.1
Cliffs/bluffs	0.1
Islands	2.1
Riparian Zones	5.1
Wetlands	0.3

Rock Island 3
This reach begins at the RM 457.1 and extends westerly for approximately 4.3 miles to the East Wenatchee Urban Growth Area boundary, and contains 206.2 acres. The shoreline is in a mix of irrigated agriculture and moderate rural density and has many shoreline alterations. Much of the residential developed area is housing and yards, with intermittent areas that are in a natural state (linear strips of shrub steppe with limited riparian areas or wetlands), and 20.4% soils of a geologic hazard as defined under the DCC. Much of the development in this reach has occurred in the last 10 years. There have been rock/earthen piers, 17 boat docks and two boat launch sites built along the shorelines. Two residences have larger beach areas with float planes moored in embayments and trail systems. There are six wetland types (NWI) in the reach, and has several large rock outcrops on the shoreline and on small islands. The habitat rating average of 3.2 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number or locations of roads. The uplands are primarily in irrigated agriculture that breaks up to steep slopes followed by a terrace with irrigated agricultural uses and the Pangborn Industrial Area and Airport. Most of the area is zoned as Rural Resource 2, and partially under a Planned Residential Development overlay, and very small areas (<1%) of 4 other designations. The average parcel size is 3.8 acres, with 86 acres of public lands. Impervious surfaces cover 9.4% of the area.

Polygon Species Habitat	Acres
Bald Eagle	0.1
Great Blue Heron	0.1
Islands	1.9
Riparian Zones	43

Waterfowl Concentrations	0.1

Rock Island 4

This reach begins at the RM 461.4 and extends northwesterly for approximately 4.1 miles to the walking bridge in the City of East Wenatchee, and contains 194.8 acres. The shoreline is in a mix of relatively urban level development, including an older manufactured home park near the start of the reach and has some shoreline alterations. Much of the area is lined by State Highway 28, with intermittent areas that are in a natural state (shrub steppe linear strips with limited riparian areas or wetlands), and 10.8% soils of a geologic hazard as defined under the DCC. The proximity of the highway has kept encroachment by other land uses from occurring in the upper half of the reach. There is one boat dock and one boat launch site built along the shoreline- Hydro Park. Hydro Park is located near the midpoint of the reach. This park has a public boat launch, picnicking, swimming and baseball sporting facilities. There are six wetland types (NWI) in the reach. The habitat rating average of 1.1 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number/location of roads, although the upper half of the reach has more functioning components that the lower half. The uplands are primarily in residential development that breaks up to steep slopes followed by a terrace with dryland agriculture uses. All of the area is zoned with urban designations- 10 different types. Overall there are 85 acres of residential zoning types (44%) and the remaining commercial types. The average parcel size is 3.6 acres, with 125.1 acres of public lands (mostly WSDOT right of way). This reach has both Douglas County and City of East Wenatchee jurisdictional areas. Impervious surfaces cover 24.1% of the area (mostly highway- 23.6%).

Polygon Species Habitat	**Acres**
Great Blue Heron	8.4
Mule Deer	0.3
Riparian Zones	0.1

Rock Island 5

This reach begins at the RM 465.4 and extends northerly for approximately 4.8 miles to RM 470.2, or the approximate extent of the East Wenatchee Urban Growth Area, and contains 258.4 acres. The shoreline has some shoreline alterations, one boat launch (undeveloped site near Odabashian Bridge) and a beach area, but is largely protected from development through it's ownership by the WSDOT (right of way) and the Apple Capital Loop Trail system. Much of the area is in a natural state- shrub steppe with some extensive forested riparian areas or wetlands), and 20.8% soils of a geologic hazard as defined under the DCC. There are six wetland types (NWI) in the reach, and an island at Porter's Pond (near the Douglas County Public Services Building and trail entrance off of 19th Street). The NWI wetland types compose 34% of the area. The

habitat rating average of 5 is due to the limited vertical corridor functions (barriers) and number/location of roads and trail system. Most of the area is zoned with urban designations- 7 different types. The uplands are primarily in residential development that breaks up to steep slopes to a terrace (Fancher Heights). Sand Canyon is the only stream in this reach, which derives most of its source of water from irrigation operations April-October. Blue Grade Canyon has a channel, but only would flow during extremely high water years, and then temporarily. Overall there are 169.9 acres of residential zoning types (66%) and the remaining commercial types and one agricultural designation (1%). The average parcel size is 5.3 acres, with 224.3 acres of public lands (mostly WSDOT right of way). This reach has both Douglas County and City of East Wenatchee jurisdictional areas. Impervious surfaces cover 13.2% of the area.

Polygon Species Habitat	**Acres**
Bald Eagle	125.3
Cavity Nesting Ducks	33.8
Great Blue Heron	33.8
Mule Deer	0.4
Riparian Zones	92.3
Waterfowl Concentrations	33.8
Wood Duck	28.4

Rock Island 6

This reach begins at the RM 470.2 and extends northerly for approximately 3.4 miles to Rocky Reach Dam, and contains 177.3 acres. The shoreline has few alterations, and is largely protected from development through it's ownership by the WSDOT (right of way), the Apple Capital Loop Trail system and CCPUD ownership near the dam. Much of the area is in a natural state- some extensive forested riparian areas or wetlands), and 23.7% soils of a geologic hazard as defined under the DCC. There are five wetland types (NWI) in the reach comprising 42% of the area. The habitat rating average of 7.1 is due to the limited vertical corridor functions (barriers) and number/location of roads and trail system. The uplands are primarily in irrigated agriculture that breaks up to steep slopes that extend up to Badger Mountain. All of the area is zoned in Commercial Agriculture 5 (55%) or 10 (45%). The average parcel size is 39.7 acres, with 169.6 acres of public lands (mostly WSDOT right of way and CCPUD). Impervious surfaces cover 2% of the area.

Polygon Species Habitat	**Acres**

Bald Eagle	4
Cavity Nesting Ducks	1
Great Blue Heron	1
Riparian Zones	87.7
Waterfowl Concentrations	1

Rocky Reach 1- Turtle Rock Island
This reach includes the entire Turtle Rock Island, approximately 2.9 miles of shoreline, and contains 160.5 acres. The island is in a relatively natural state composed of rocky shrub steppe with some riparian/wetland areas mostly located on the south end. There are five wetland types (NWI) on the island. The habitat rating average of 15.4 is due to the Eastbank Fish Hatchery (WDFW/DCPUD), one dock and the low number of priority habitat types. The northern end of the island has steep to moderate slopes, whereas the south end, where the hatchery facility is located, is flatter. Eighteen percent of soils are of a geologic hazard as defined under the Douglas County Code (DCC). The area is entirely zoned as Rural Resource 20. The island is one parcel, all of which are public lands (CCPUD). Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Bald Eagle	315.9
Islands	155.7
Waterfowl Concentrations	165.1

Rocky Reach 2
This reach begins at the Rocky Reach Dam and extends north for approximately 34.2 miles to just north of Beebe Bridge at RM 507.8, and contains 1854.8 acres. The shoreline is in a mix of irrigated agriculture and moderate rural density and has many shoreline alterations. There are several denser areas of development including the Town of Orondo, Sun Cove (Lake Entiat Estates), Bauer's Landing, Long View Orchards, Sanford Shores, and Columbia Point. Much of the residential developed area is housing and yards or irrigated agriculture, with intermittent areas that are in a natural state (linear strips of shrub steppe with limited riparian areas or wetlands), and 48.7% soils of a geologic hazard as defined under the DCC. US Highway 2/97 follows the river throughout this reach, and at several points provides the bank of the river (rock armor). There have been rock/earthen piers, 77 boat docks and nine boat launch sites built along the shorelines. Some of the docks and most of the boat launches are located in one of the four major shoreline parks in this reach; Lincoln Rock, Orondo, Daroga and

Beebe parks. Two of the major developments have large beach areas with community boat launches and docks; Bauer's Landing and Sun Cove. There are six wetland types (NWI) in the reach, and there are several large rock outcrops on the shoreline and very small islands. The uplands are primarily in irrigated agriculture mixed with low density rural development, followed by steep shrub steppe, mixed with some houses near Beebe Bridge, then by the plateau with shrub steppe and dryland agricultural uses. The habitat rating average of 3.1 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number or locations of roads, and extensive developed areas, although there are six different priority habitat types. Pine Canyon (at Orondo) and McNeil Canyon (near Beebe Bridge) watersheds drain into the Columbia River in this reach. There are six different types zoning in this reach. Most of the area is zoned as Rural Resource 5 (50%), followed by Rural Recreation (16%) and Rural Resource 20 (15%) and some are under a Recreation Overlay zone. The other designations include Rural Service Center (Orondo) and Commercial Agriculture 10 (south end). The average parcel size is 14.3 acres, with 408.4 acres (26%) of public lands. Impervious surfaces cover 15.1% of the area (includes the dam, roads are 12.1%).

According to Chelan County PUD data there are 28 areas where rare plants occur, all in the southern two-thirds of the reach (approximately the southern boundary to Bauer's Landing). There are also 23 areas with significant sized aquatic plant beds.

Polygon Species Habitat	**Acres**
Bald Eagle	401.8
Common Loon	7.4
Islands	0.5
Lewis' Woodpecker	23.3
Mule Deer	357.9
Riparian Zones	34.9
Sharp-tailed Grouse	33.4
Waterfowl Concentrations	347.6
Wetlands	54.2

PHS Points- Two sites of loons, nesting and breeding.

Rocky Reach 3

This reach begins at RM 507.8 and extends northerly for approximately 7.7 miles to Wells Dam, and contains 394.7 acres. There are no buildings within the reach and the shoreline is in a relatively natural state, shrub steppe that continues upland for long distances, with some sandy/gravel escarpments. There are six wetland types (NWI) in the reach. The habitat rating average of 35 is due to the lack of roads and development, although only three habitats were located within the reach. Only 1.5% of the areas are in wetland/riparian habitat. The majority of the area is shrub steppe and has steep to moderate slopes, and 69.8% soils of a geologic hazard as defined under the Douglas County Code (DCC). The area is entirely zoned as Rural Resource 20. The average parcel size is 168.6 acres, with 374.5 acres (95%) of public lands that are located on the shoreline. Impervious surfaces cover 0.2% of the area.

According to Chelan County PUD data there are three areas where rare plants occur, all in the southern two-thirds of the reach (approximately the southern boundary to Bauer's Landing). There are also three areas with significant sized aquatic plant beds.

Polygon Species Habitat	**Acres**
Bald Eagle	4.2
Chukar	298.9
Common Loon	0.4
Mule Deer	390.1
Sharp-tailed Grouse	390.1
Waterfowl Concentrations	2

Columbia River Wells Pool reaches listed below are almost entirely owned by the Douglas County PUD; the shoreline itself is entirely owned by the DCPUD with the exception of the island set aside for wildlife habitat across from the mouth of the Okanogan River.

Wells 1
This reach begins at Wells Dam and extends northerly for approximately 7.8 miles to RM 523.3, and contains 399.5 acres. The shoreline is in a relatively natural state, shrub steppe that continues upland for long distances with some sandy/gravel escarpments. There are five wetland types (NWI) in the reach. The habitat rating average of 35 is due to the lack of roads and development, although only three habitats were located within the reach. The majority of the area is shrub steppe and has steep to moderate slopes, and 63.5% soils of a geologic hazard as defined under the Douglas County Code (DCC). The area is almost entirely zoned as Rural Resource 20, with 5.1% in Commercial Agriculture 10. The average parcel size is 88.3 acres, with 151.8 acres

(38%) of public lands that are located on the shoreline. Impervious surfaces cover 7.3% of the area (Wells Dam).

Polygon Species Habitat	Acres
American White Pelican	17.2
Bald Eagle	66.9
California Quail	10.2
Chukar	344.9
Common Loon	44.5
Mule Deer	352.2
Riparian Zones	42.5
Sharp-tailed Grouse	504.6
Shrub steppe	131.9
Waterfowl Concentrations	103.8

Wells 2
This reach begins at RM 523.3 and extends westerly for approximately 6.7 miles to the Brewster Bridge (SR 17), and contains 321.4 acres. The shoreline is in a mix of irrigated agriculture and rural density development with few shoreline alterations. Much of the irrigated agriculture area is divided with intermittent areas that are in a natural state (linear strips of shrub steppe with limited riparian areas or wetlands), and 17.4% soils of a geologic hazard as defined under the DCC. There are six wetland types (NWI) in the reach (20.4% of the area), and there are several small islands. The habitat rating average of 36.4 is due several habitats located within the reach and limited encroachment by upland activities. The uplands are primarily in irrigated agriculture that breaks up to steep slopes followed by the plateau- a mix of shrub steppe and dryland agriculture. The area is almost entirely zoned as Commercial Agriculture 10, with 5% in Rural Resource 20. The average parcel size is 22.5 acres, with 86.1 acres of public lands. Impervious surfaces cover 8.2% of the area (7.4% roads).

Polygon Species Habitat	Acres
Bald Eagle	184.3

California Quail	288.6
Canada Goose	3.3
Chukar	0.1
Cliffs/bluffs	0.1
Common Loon	20.6
Islands	2.7
Mule Deer	300.2
Riparian Zones	172.8
Sharp-tailed Grouse	8.7
Shrub steppe	67.8
Waterfowl Concentrations	327

PHS Points- Three separate osprey nesting sites.

Wells 3
This reach begins at the Brewster Bridge and extends easterly for approximately 9 miles to RM 539, and contains 453.8 acres. The shoreline is in a mix of irrigated agriculture and rural density development with few shoreline alterations. Much of the residential developed area is housing and yards, with intermittent areas that are in a natural state (linear strips of shrub steppe with limited riparian areas or wetlands), and 15.7% soils of a geologic hazard as defined under the DCC. There are six wetland types (NWI) in the reach (24.2% of the area), and there are several islands, some with small wetlands and vegetation, and one large island across from the mouth of the Okanogan River that the WDFW manages. The habitat rating average of 17.1 is due irrigated agriculture that fractures the habitat in many places and roads. The uplands are primarily in irrigated agriculture for 2-3 miles inland that breaks up to steep slopes followed by the plateau- a mix of shrub steppe and dryland agriculture. The area is mostly zoned as Rural Resource 20 (61.9%), followed by Rural Resource 5, (38%) and Resource Service Center (Rocky Butte Town site). The average parcel size is 31.9 acres, with 334 acres (73.6%) of public lands. Impervious surfaces cover 4.8% of the area (4.6% roads).

Polygon Species Habitat	**Acres**

American White Pelican	179.2
Bald Eagle	426
California Quail	225.4
Canada Goose	94.1
Cavity Nesting Ducks	94.1
Chukar	43
Cliffs/bluffs	43
Common Loon	81.8
Islands	94.1
Mule Deer	49.4
Ring-necked Pheasant	201.8
Riparian Zones	114.1
Sharp-tailed Grouse	6.4
Shrub steppe	106.7
Waterfowl Concentrations	407.6

PHS Points- Four osprey nesting sites, one burrowing owl site, one heron rookery, and one golden eagle, unknown use.

Wells 4
This reach begins at the RM 539 and extends easterly for approximately 3.3 miles to the Bridgeport Urban Growth Area, and contains 204.2 acres. The shoreline is in a mix of irrigated agriculture and rural density development with few shoreline alterations. Much of the residential developed area is housing and yards, along with intermixed irrigated agriculture and areas that are in a natural state (linear strips of shrub steppe with limited riparian areas or wetlands), and 33.2% soils of a geologic hazard as defined under the DCC. There are five wetland types (NWI) in the reach (25.7% of the area). The habitat rating average of 3.8 is due irrigated agriculture and rural development that fractures the habitat in many places and roads. The uplands are primarily in irrigated agriculture for 2-3 miles inland that breaks up to steep slopes followed by the plateau- a mix of shrub

steppe and dryland agriculture. The area is mostly zoned as Rural Resource 5 (48.8%), followed by Commercial Agriculture 10 (23.1), Rural Resource 20 (14.5%) and Resource Service Center- 13.4% (Rocky Butte and Downing Town sites). The average parcel size is 10.2 acres, with 91.9 acres (45%) of public lands. Impervious surfaces cover 4.9% of the area (4.2% roads).

Polygon Species Habitat	**Acres**
American White Pelican	5.5
Bald Eagle	72.3
California Quail	133.9
Canada Goose	0.9
Cavity Nesting Ducks	0.9
Chukar	1.9
Common Loon	5.5
Islands	0.9
Mule Deer	1.9
Ring-necked Pheasant	51.8
Riparian Zones	60.6
Shrub steppe	51.8
Waterfowl Concentrations	61.5

Wells 5
This reach begins at the Bridgeport Urban Growth Area, RM 542.3, and extends easterly for approximately 2.7 miles to Chief Joseph Dam, and contains 144.3 acres. The shoreline is in a mix of urban level development, much of which is residential area of housing and yards, and has some shoreline alterations. There are some agricultural activities, but not directly in contact with the waters edge. Near Chief Joseph Dam the US Corps of Engineers has a park and some parking area. This section, which Foster Creek flows through, is armored to prevent erosion. There are two docks and two boat ramps within Marina Park, which also includes a manmade inlet; one ramp and the two docks are located there. The waterfront itself is a strip of narrow land with intermittent

areas that are in a natural state (shrub steppe linear strips with limited riparian areas or wetlands), and 19.3% soils of a geologic hazard as defined under the DCC. The DCPUD ownership has kept encroachment by other land uses from occurring along the shore. There are four wetland types (NWI) in the reach. The habitat rating average of 3 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number/location of roads and urban development. The uplands are primarily in residential development that breaks up to steep slopes followed by a terrace with dryland agriculture uses. Foster Creek watershed drains into this reach just below Chief Joseph Dam. That stream has use by spring Chinook salmon (rearing) and steelhead trout (spawning and rearing) (unpublished data- FCCD, WDOE 2001-2006). The zoning designations include public (88%), followed by multi-family (6.3%) and Rural Resource 20 (5.1%). The average parcel size is 1.6 acres, with 89.9 acres of public lands (95%). This reach has both Douglas County and City of Bridgeport jurisdictional areas. Impervious surfaces cover 11.5% of the area.

Polygon Species Habitat	**Acres**
Bald Eagle	91.6
California Quail	87.6
Mule Deer	37
Riparian Zones	91.6
Sharp-tailed Grouse	37
Waterfowl Concentrations	63.1

Lake Rufus Woods

Lake Rufus Woods is the longest pool on the Columbia River in Douglas County (51.3 miles). Eleven reaches were identified. A common feature to these reaches is that there are long narrow bands (6-15 feet) of somewhat less stable gravel and sand shorelines that erode because of their soils composition, slope, wave action, and hydro operations. This reservoir has a significant rainbow trout fishery, enhanced by commercial net pen raised triploid rainbow trout operations on the Okanogan County (Colville Reservation) side of the river. There are also kokanee salmon, which spawn in areas such as the Nespelem River, bull trout (rare), several sucker species, sculpins, some warm-water species, such as bass and sunfish, carp and sturgeon. Chief Joseph Dam blocks any anadromous use in the area above the dam.

Rufus Woods 1

This reach begins at Chief Joseph Dam extends northerly for approximately 0.8 miles ending at RM 545.7, and contains 95.6 acres. The shoreline is in almost completely altered as the dam facilities, rock armoring, and three boat ramps and docks comprise

most of the shoreline. There are two wetland types (NWI) in the reach. The habitat rating average of 0.6 is due to very limited existing habitat. The soils are comprised of 8.6% geologic hazard as defined under the DCC. The uplands are primarily shrub steppe and dryland agricultural uses. The area is zoned as Rural Resource 20 (36%) and Public (64%). The average parcel size is 88.4 acres, with 94.8 acres (99.2%) of public lands (USCOE). Impervious surfaces cover 60.1% of the area (dam, roads, and armor).

Polygon Species Habitat	**Acres**
Bald Eagle	108.9
California Quail	95.6
Chukar	0.1
Mule Deer	79.5
Riparian Zones	148.3
Sharp-tailed Grouse	40.1
Waterfowl Concentrations	0.1

Rufus Woods 2
This reach begins at RM 545.7 and extends easterly for approximately 2.7 miles, and contains 140.7 acres. The shoreline is in a mix of shrub steppe small areas of irrigated agriculture and with few shoreline alterations, and 70.5% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach. The habitat rating average of 6.1 is due to the irrigated agriculture, low number of habitat types and roads. The uplands are primarily a mix of irrigated agriculture, shrub steppe and dryland agriculture. The area is mostly zoned as Commercial Agriculture 10 (48.8%), followed by Dryland Agriculture (19.9%) and Rural Resource 20 (18.4%). The average parcel size is 38.2 acres, with 69.8 acres (50%) of public lands. Impervious surfaces cover 10% of the area (9.9% roads).

Polygon Species Habitat	**Acres**
Bald Eagle	34.5
California Quail	17.5
Chukar	123.2

Mule Deer	123.4
Ring-necked Pheasant	1.9
Riparian Zones	36.4
Sharp-tailed Grouse	15.7
Waterfowl Concentrations	15.4

PHS Points- one sagebrush vole and one white-tailed jack rabbit.

Rufus Woods 3
This reach begins at RM 548.4 and extends easterly for approximately 2.3 miles, and contains 121.4 acres. The shoreline is in a mix of irrigated agriculture and shrub steppe with few shoreline alterations, and 33.1% soils of a geologic hazard as defined under the DCC. This reach was separated out between reach 2 and 4 because the level of irrigated agriculture (>30%) in the shoreline area is substantially higher than areas above or below it. There are three wetland types (NWI) in the reach. The habitat rating average of 7.5 is due to irrigated agriculture, low number of habitat types and roads. The uplands are primarily a mix of irrigated agriculture, shrub steppe and dryland agriculture. The area is mostly zoned entirely as Commercial Agriculture 10. The average parcel size is 77.3 acres, with 15.1 acres (12%) of public lands. Impervious surfaces cover 1.5% of the area (gravel roads).

Polygon Species Habitat	**Acres**
Bald Eagle	64.1
Chukar	121.3
Mule Deer	89.4
Riparian Zones	64
Waterfowl Concentrations	32.1

Rufus Woods 4
This reach begins at RM 550.7 and extends easterly for approximately 17.4 miles, and contains 944.4 acres. The shoreline is in a mostly shrub steppe with small areas of irrigated or dryland agriculture, has few shoreline alterations, and 57.9% soils of a geologic hazard as defined under the DCC (steeper slopes). There is one public access point, Brandt's Landing, with minimal services (approximately 7 miles upstream from Chief Joseph Dam. There are five wetland types (NWI) in the reach that comprise 11%

of the reach. The habitat rating average of 30.8 is due to the higher number of habitat types, the horizontal and vertical depth of habitat and minimal number of roads. This reach has a large island with shrub steppe habitat on it (43.4 acres). The uplands are primarily a mix of shrub steppe and dryland agriculture. The area is mostly zoned as Rural Resource 20 (95.8%), with Commercial Agriculture 10 (2.8%), followed by Dryland Agriculture (1.4%). The average parcel size is 113.3 acres, with 668.6 acres (71%) of public lands. Impervious surfaces cover 1% of the area (roads).

Polygon Species Habitat	**Acres**
Bald Eagle	415.8
Chukar	898
Islands	18
Mule Deer	557.6
Riparian Zones	372.7
Waterfowl Concentrations	75.4

PHS Points- one pallid bats, one bald eagle nest site, and two golden eagle, unknown use.

Rufus Woods 5
This reach begins at RM 568 and extends easterly for approximately 1 mile, and contains 42.4 acres. The shoreline is in a mostly dryland agriculture and shrub steppe with substantial area of wetlands, has few shoreline alterations, and 41.3% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach that comprise 18% of the reach. The habitat rating average of 0.8 is due to the high amount of dryland agriculture, low number of habitat types and roads. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (75.8%), and Dryland Agriculture (24.1%). The average parcel size is 78.8 acres, with 0.1 acres of public lands. Impervious surfaces cover 6.3% of the area (roads).

Polygon Species Habitat	**Acres**
Bald Eagle	24.3
Chukar	37.9
Mule Deer	18.1

Riparian Zones	19.9
Waterfowl Concentrations	4.4

Rufus Woods 6
This reach begins at RM 569 and extends easterly for approximately 8.3 miles, and contains 440.2 acres. The shoreline is in a mostly shrub steppe with small areas of dryland agriculture, has few shoreline alterations, and 60.8% soils of a geologic hazard as defined under the DCC (steeper slopes). There are six wetland types (NWI) in the reach that comprise 6.5% of the reach. The habitat rating average of 39.9 is due to the number of habitat types, the horizontal and vertical depth of habitat and no roads in along the shoreline. The uplands are primarily a mix of shrub steppe and dryland agriculture. The area is zoned as Rural Resource 20 (36%) and Dryland Agriculture (64%). The average parcel size is 90.9 acres, with 124.6 acres (28%) of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Bald Eagle	258.2
Chukar	350.4
Mule Deer	272.5
Riparian Zones	237.3
Waterfowl Concentrations	20.9

PHS Points- two bald eagle nests and two golden eagle nests.

Rufus Woods 7
This reach begins at RM 577.3 and extends easterly for approximately 0.9 miles, and contains 35.4 acres. The shoreline is in a mostly irrigated agriculture and shrub steppe, has few shoreline alterations, and 32.7% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach that comprise less than 1% of the area. The habitat rating average of 16.5 is due to the lower number of habitat types, the horizontal depth of habitat and no roads in along the shoreline. The uplands are primarily a mix of irrigated agriculture, shrub steppe, and dryland agriculture. The area is zoned as Dryland Agriculture (93%) and Rural Resource 20 (7%). The average parcel size is 91.6 acres, with 0 acres of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**

Bald Eagle	17.5
Mule Deer	35.2
Riparian Zones	17.2
Waterfowl Concentrations	0.3

Rufus Woods 8
This reach begins at RM 578.1 and extends easterly for approximately 2.3 miles, and contains 125.3 acres. The shoreline is in a mostly shrub steppe and shrub steppe-ponderosa pine (70%) and dryland agriculture, has few shoreline alterations, and 70.5% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach that comprise less than 1% of the area. The habitat rating average of 74.9 is due to the number of habitat types, the horizontal and vertical depth of habitat and no roads in along the shoreline. The uplands are primarily shrub steppe. The area is zoned as Dryland Agriculture (18%) and Rural Resource 20 (82%). The average parcel size is 162.2 acres, with 53.6 acres (43%) of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Bald Eagle	50.9
Mule Deer	122.1
Riparian Zones	47.7
Waterfowl Concentrations	3.2

PHS Points- two bald eagle winter roosts and one golden eagle, unknown use.

Rufus Woods 9
This reach begins at RM 580.4 and extends easterly for approximately 0.9 miles, and contains 35.4 acres. The shoreline is in a mostly shrub steppe (nearly 100%), has few shoreline alterations, and no soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach that comprise less than 1% of the area. The habitat rating average of 12 is due to the number of habitat types, and the limited vertical depth of habitat (the 200 to 400+ foot area above the shoreline is all under irrigated agriculture). The uplands are primarily irrigated agriculture, shrub steppe and dryland agriculture. The area is zoned entirely as Dryland Agriculture. The average parcel size is 246.9 acres, with 0 acres of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	Acres
Bald Eagle	15.1
Mule Deer	16.9
Riparian Zones	12.7
Waterfowl Concentrations	2.4

Rufus Woods 10
This reach begins at RM 580.9 and extends easterly for approximately 14.8 miles, and contains 721.7 acres. The shoreline is in a mostly shrub steppe with sandy escarpments and talus slopes, has substantial shoreline alterations in the upper 2-3 miles (rock armor/stabilization), and 62% soils of a geologic hazard as defined under the DCC (steeper slopes). There are three wetland types (NWI) in the reach that comprise 0.5% of the reach. The habitat rating average of 33.8 is due to the higher number of habitat types, the horizontal and vertical depth of habitat and low number of roads (most in the upper 1-2 miles). This reach has a several small islands. The uplands are primarily a mix of shrub steppe and dryland agriculture. The area is mostly zoned as Rural Resource 20 (83%), with some Dryland Agriculture (17%). The average parcel size is 144.2 acres, with 256.2 acres (35.5%) of public lands. Impervious surfaces cover <1% of the area (roads).

Polygon Species Habitat	Acres
Bald Eagle	430.5
Chukar	235.6
Islands	20.9
Mule Deer	680.5
Riparian Zones	360.6
Rocky Mountain Elk	0.5
Sharp-tailed Grouse	14.6
Waterfowl Concentrations	16.8

PHS Points- Two bald eagle nest sites, and one golden eagle, unknown use.

Rufus Woods 11
This reach begins at the Coulee Dam Urban Growth Area and extends easterly for approximately 0.5 miles to Grand Coulee Dam, and contains 23.5 acres. The shoreline is in a mix of urban level development, much of which is residential area of housing and yards, and has some shoreline alterations. The waterfront itself is a strip of narrow land with rock armoring, and 98.5% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach (<1%). The habitat rating average of 0.2 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number/location of roads and urban development. The uplands are primarily in residential development that breaks up to steep slopes and rock faces followed by a terrace with dryland agriculture uses and shrub steppe. The zoning designations data was not available for the City of Coulee Dam. The average parcel size is 7.3 acres, with 12.7 acres of public lands (54%). Impervious surfaces cover 4.4% of the area (does not include rock armor).

Polygon Species Habitat	**Acres**
Bald Eagle	4.7
Chukar	0.1
Mule Deer	0.2
Riparian Zones	0.1
Rocky Mountain Elk	19.1

PHS Points- one golden eagle, unknown use.

Interior lakes.
Rock Island Teacup Area (Oxbow Lakes)
The series of lakes that make up this subsection are hydrologically connected to each other and to the Columbia River through groundwater interactions. Putter's Pond is a series of small lakes that includes Pit and Marina Lakes as they are separated only by thin slivers of land (about a car width), much of which has been changing as there is a gravel mining operation that has been deepening the lakes (improving fish habitat and reducing the level of aquatic vegetation) and providing these narrow bands of sand and gravel to improve the recreational values of the lakes. These lakes are an old oxbow (channel) of the Columbia River that formed when the Malaga slide occurred approximately 11-12,000 years ago (Charlie Mason, personal communication, May 2006). This area prior to the slide was covered by Glacial Lake Wenatchee, which covered an area roughly from Moses Coulee to Rocky Reach Dam. At the time of the original adoption of the SMP these lakes were just small wetland areas, but with the raising of the pool behind Rock Island in the early 1970s, water seeped through the

ground and raised these low lying areas into lakes that are both large enough and hydrologically connected to fall under within the criteria.

Big Bow Lake 1
This reach is mostly on the southern side of the lake, is 1.1 miles in length, and contains 58.5 acres. The shoreline is in a mix of irrigated agriculture and moderate rural density residential development and has one boat launch and a dock. Much of the residential developed area is housing and yards or irrigated agriculture, and 8.5% soils of a geologic hazard as defined under the DCC. There are six wetland types (NWI) in the reach and comprises 69% of the area and has several non-native species of trees. The uplands are primarily in irrigated agriculture mixed with low density rural development. The habitat rating average of 1.1 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number or locations of roads, and developed areas. There are three different types of zoning in this reach. Most of the area is zoned as Rural Resource 2 (92%), followed by Residential Low (8%) and Rural Resource 5 (<1%). The average parcel size is 4.2 acres, with 16.1 acres (28%) of public lands (CCPUD). Impervious surfaces cover 8.9% of the area (roads 6.6%).

Polygon Species Habitat	**Acres**
Wetlands- part of this includes most of Blue Heron Lake	61.5

Big Bow Lake 2
This reach is on the northern shore of the lake, is approximately 0.7 miles in length, and contains 36.5 acres. The shoreline is in a relatively natural state; shrub steppe continues upland to an area of irrigated agriculture east of Pangborn Memorial Airport. There are five wetland types (NWI) in the reach and comprises 70% of the area and has several non-native species of trees. The habitat rating average of 2.7 is due to the limited habitat types, vertical and horizontal corridor functions and number or location of roads. The remaining area is shrub steppe and has moderate slopes, and 10.4% soils of a geologic hazard as defined under the Douglas County Code (DCC). Most of the area is zoned as Rural Resource 5 (54%), followed by Rural Resource 2 (46%). The average parcel size is 11.8 acres, with 8 acres (22%) of public lands (CCPUD) that are located on the shoreline. Impervious surfaces cover 6.3% of the area (roads 5.9%).

Polygon Species Habitat	**Acres**
Wetlands	6.3

Blue Heron Lake
Blue Heron Lake only has one reach as it is similar around the entire area. The length is approximately 0.8 miles in length, and contains 40.3 acres. The shoreline is in a relatively natural state; shrub steppe continues upland above a band of developed area to an area of irrigated agriculture east of Pangborn Memorial Airport. There are five

wetland types (NWI) in the reach and comprises 28% of the area and has several non-native species of trees. The habitat rating average of 0.8 is due to the limited habitat types, vertical and horizontal corridor functions, buildings and number or location of roads, including SR28. The area has no soils of a geologic hazard as defined under the Douglas County Code (DCC). All of the area is zoned as Rural Resource Rural Resource 2. The average parcel size is 4.7 acres, with 3.5 acres (8.8%) of public lands (CCPUD) that are located on the shoreline. Impervious surfaces cover 16.2% of the area (roads 15.3%).

Polygon Species Habitat	**Acres**
Wetlands	8.2

Hammond Lake 1
This reach on the western half of the lake, is 1.2 miles in length, and contains 49.4 acres. The south shore of the lake, along SR28 is included in the Rock Island Reach One description. The shoreline is in a mix of recreational uses, Rock Island Golf Course, low density residential development and a small area of irrigated agriculture. There is one boat launch on the north side of the lake. Much of the residential developed area is housing and yards, and 13.2% soils of a geologic hazard as defined under the DCC. There are five wetland types (NWI) in the reach and comprises 13% of the area and has several non-native species of trees, including Russian olive. The uplands are primarily in irrigated agriculture on the north east end, and golf course on the rest. The habitat rating average of 1.2 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number or location of developed areas, although the golf course is used extensively by Canada Geese year around. There are four different types of zoning in this reach. Most of the area is zoned as Public (79%), followed by Mixed Recreation (21%), and Rural Resource 20 (<1%), Residential Low (<1%). The average parcel size is 15.3 acres, with 16.1 acres (81%) of public lands (City of Rock Island). Impervious surfaces cover 2.8% of the area (roads).

Polygon Species Habitat	**Acres**
Wetlands	9.8

Hammond Lake 2
This reach is on the western half of the lake, is 0.6 miles in length, and contains 24.3 acres. The shoreline is in a mix of low density residential development, shrub steppe and irrigated agriculture. There is one unimproved boat launch on the southeast corner of the lake. Much of the residential developed area is housing and yards, and 27.6% soils of a geologic hazard as defined under the DCC. There are five wetland types (NWI) in the reach and comprises 15% of the area and has several non-native species of trees, including Russian olive. The uplands are primarily in irrigated agriculture and shrub steppe, leading to cliffs and talus that are located on the east side of Battermann

Road. The habitat rating average of 1.9 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number or location of developed areas. There are five different types of zoning in this reach. Most of the area is zoned as Rural Resource 20 (56%), followed by Residential Low (30%), Commercial Agriculture 10 (8%), Public (5%), and Mixed Recreation (<1%). The average parcel size is 28.5 acres, with 3.5 acres (14%) of public lands (City of Rock Island). Impervious surfaces cover 20.4% of the area (roads).

Polygon Species Habitat	**Acres**
Wetlands part of this includes a portion of Putters Lake	83.4

Hideaway Lake 1
This reach is mostly on the southern side of the lake, is 0.5 miles in length, and contains 32.7 acres. The shoreline is in a mix of wetlands, irrigated agriculture, and low rural density residential development. There is a water utility on the southeast corner of the lake. Most of the area is wetlands (64%), and 11% soils of a geologic hazard as defined under the DCC. There are five wetland types (NWI) in the reach that includes several non-native species of trees. The uplands are primarily in irrigated agriculture mixed with low density rural development. The habitat rating average of 2.7 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number or locations of roads, and developed areas. There are three different types of zoning in this reach. Most of the area is zoned as Rural Resource 2 (46%), followed by Rural Resource 5 (32%) and Residential Low (22%). The average parcel size is 3.9 acres, with 14.1 acres (43%) of public lands (CCPUD). Impervious surfaces cover 3.1% of the area.

Polygon Species Habitat	**Acres**
Wetlands	15.4

Hideaway Lake 2
This reach is on the northern shore of the lake, is approximately 0.4 miles in length, and contains 36.5 acres. The shoreline is in a relatively natural state; shrub steppe (86% of the area) continues upland to an area of irrigated agriculture east of Pangborn Memorial Airport. There are five wetland types (NWI) in the reach and comprises 14% of the area and has several non-native species of trees. The habitat rating average of 4 is due to the limited habitat types, vertical and horizontal corridor functions and number or location of roads. The remaining area is shrub steppe and has moderate slopes, and 10.4% soils of a geologic hazard as defined under the Douglas County Code (DCC). Most of the area is zoned as Rural Resource 5 (83%), followed by Rural Resource 2 (17%). The average parcel size is 23.8 acres, with 17.6 acres (72%) of public lands (CCPUD) that are located on the shoreline. Impervious surfaces cover 0% of the area. Though the habitat rating is low, in a discussion with Ray Pearson (Rock Island City

Councilman) he has observed that bobcat, otters, muskrat, beaver and other species utilizing this lake and some of the others in the Rock Island teacup.

Polygon Species Habitat	Acres
Wetlands	6.5

Putter's Pond 1, includes part of Pit Lake
This reach includes part of Pit Lake, a juvenile fishing pond. The reach is on the northwestern part of the lake, is 0.5 miles in length, and contains 17.7 acres. The shoreline is in a mix of residential development within the City of Rock Island, and 2.8% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach and comprises 2.8% of the area. The uplands are in residential and commercial development. The habitat rating average of 0.4 reflects those attributes; limited existing habitat, vertical and horizontal corridor functions (barriers) and developed areas. There are four different types of zoning in this reach. Most of the area is zoned as Residential Low (64%), Commercial (18%), Public (18%), and Mixed Recreation (<1%). The average parcel size is 1 acre, with 4.4 acres (25%) of public lands (City of Rock Island). Impervious surfaces cover 28.4% of the area (16.1% roads).

Polygon Species Habitat	Acres
Wetlands	1.9

Putter's Pond 2, includes part of Pit Lake
This reach includes part of Pit Lake, a juvenile fishing pond. The reach is on the north part of the lake, is 0.8 miles in length, and contains 26.2 acres. The shoreline is in a mix of recreational uses and undeveloped area above Saunders Road (but within the urban growth area) and 0.8% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach and comprises 11% of the area. The uplands are primarily in shrub steppe and irrigated agriculture. The habitat rating average of 1.2 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number or location of developed areas. There are three different types of zoning in this reach. Most of the area is zoned as Mixed Recreation (77%), Public (23%), followed by Residential Low (<1%). The average parcel size is 16.2 acres, with 9.5 acres (36%) of public lands (City of Rock Island). Impervious surfaces cover 26.2% of the area (roads).

Polygon Species Habitat	Acres
Wetlands	1

Putter's Pond 3

This reach is on the northeastern part of the lake, is 0.5 miles in length, and contains 16.7 acres (some area shared with Hammond Lake Reach 1). The shoreline is all part of the Rock Island Golf Course and has 3.6% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach and comprises <1% of the area. The uplands are primarily part of Hammond Lake or in shrub steppe to the northeast. The habitat rating average of 0 is due to no priority habitats, vertical and horizontal corridor functions (barriers), although the golf course is used extensively by Canada Geese year around. The entire area is zoned as Public. The average parcel size is 11.8 acres, with 100% in public lands (City of Rock Island). Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Wetlands	1.6

Putter's Pond 4
This reach is comprised of rock, sand and gravel- the dividing lanes/peninsulas created between the small lakes making up this area. There are trees and wetland habitat areas intermixed among the shoreline areas of this reach. The length is approximately 0.3 miles and 11.2 acres. Please note the shorelines are shared among the other reaches so the short length is misleading.

Polygon Species Habitat	**Acres**
Wetlands	8.1

Putter's Pond 5- includes part of Marine Lake
This reach is on the western part of the lake, is 0.4 miles in length, and contains 14.8 acres. The shoreline is in industrial and residential uses, and 0% soils of a geologic hazard as defined under the DCC. The industrial use is the sand and gravel mining operation along the south end of the reach, near SR28. There are three wetland types (NWI) in the reach and comprises 3.3% of the area and has several non-native species of trees, including Russian olive. The uplands are commercial and residential development (City of Rock Island). The habitat rating average of 0.5 is due to the limited existing habitat, vertical and horizontal corridor functions (barriers) and number or location of developed areas. There are two different types of zoning in this reach. Most of the area is zoned as Tourist Commercial (98%) and Public (2%), followed. The average parcel size is 6.5 acres, with 5.3 acres (36%) of public lands (City of Rock Island). Impervious surfaces cover 30% of the area (21% roads).

Polygon Species Habitat	**Acres**
Wetlands	2.1

Putter's Pond 6- includes most of Marina Lake
This reach includes most of Marina Lake. The reach is on the western part of the lake, is 0.2 miles in length, and contains 7 acres. The shoreline is in a mix of residential development within the City of Rock Island, and 0% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach and comprises 11.5% of the area. The uplands are in residential and commercial development. The habitat rating average of 1.5 reflects those attributes; limited existing habitat, vertical and horizontal corridor functions (barriers) and developed areas. There are three different types of zoning in this reach. Most of the area is zoned as Residential Low (83%), Commercial (1.4%), and Rural Resource 20 (16%). The average parcel size is 3.8 acres, with 0 acres of public lands. Impervious surfaces cover 11.3% of the area (roads).

Polygon Species Habitat	**Acres**
Wetlands	0.1

Banks Lake Area (Coulee Lakes, in the Grand Coulee)
Banks Lake 1
This reach of Banks Lake includes seven separate sections of shoreline that intersect the Douglas County line on the east side of the county that have common features. The southernmost extent is just above Dryfalls Dam (US Highway 2) and extends north/northeast for to Township 28 north, Range 29 east, Section 29, has a combined length of 4.7 miles and contains 232.2 acres. The shoreline is in a relatively natural state with substantial cliff and talus habitat (50%). There are some recreational sites in the southern most area with boating facilities, but the facilities themselves are in Grant County except for some of the parking lot area. There are four wetland types (NWI) in the reach (4.7% of the area). The habitat rating average of 43.4 is due to the number of priority habitat types, vertical and horizontal corridor functions and limited roads and access. The majority of the rest of the area is rocky shrub steppe and has steep slopes, and 100% of the soils considered geologic hazard as defined under the Douglas County Code (DCC). The uplands are primarily in steep shrub steppe mixed talus and cliff, and dryland agriculture on the plateau. The area is mostly zoned as Rural Resource 20 (90%), with some Dryland Agriculture (10%). The average parcel size is 226.5 acres, with 227.1 acres (98%) of public lands that are part of the Banks Lake Recreational Area. Impervious surfaces cover 2.4% of the area (roads and parking lot), which does not include rock and talus slopes.

Polygon Species Habitat	**Acres**
American White Pelican	9.7
Bald Eagle	30.4

Chukar	16.6
Cliffs/bluffs	141.4
Mule Deer	155.9
Riparian Zones	30.1
Sage Grouse	11.7
Waterfowl Concentrations	7

Banks Lake 2
This reach of Banks Lake is one section of shoreline that intersects the Douglas County line on the east side of the county in the Barker Canyon area, has a length of 1.3 miles and contains 57 acres. The shoreline is mostly shrub steppe (81%) with some trees (both native and non-native) and a small island (rock). There are some recreational uses along the shoreline and a possible undeveloped boat launch. There are 5 wetland types (NWI) in the reach (4.6% of the area). The habitat rating average of 12.6 is due to the limited vertical and horizontal corridor functions from the primitive roads that crisscross much of the shoreline. One hundred percent of the soils area considered geologic hazard as defined under the Douglas County Code (DCC). The uplands are primarily in steep shrub steppe mixed talus and cliff, and dryland agriculture on the plateau. The area is mostly zoned as entirely as Rural Resource 20. The average parcel size is 277.2 acres, with 57 acres (100%) of public lands that are part of the Banks Lake Recreational Area. Impervious surfaces cover 6.8% of the area (roads and parking lot).

Polygon Species Habitat	**Acres**
Bald Eagle	67.6
Cliffs/bluffs	2
Riparian Zones	10.6
Sage Grouse	12.3

Jameson Lake Area (Coulee Lakes in the Moses Coulee)
Grimes Lake 1
This is an alkaline lake that is the upper most of the three lakes in this area connected by a stream channel and wetlands to Bennett Lake, and has a small dam at the outlet that was built in the 1930s. This reach has a length of approximately 1.1 miles, and contains 50.3 acres and forms the east side of the lake. The shoreline has extensive cliff, talus and rocky shrub steppe habitats that extend well beyond the 200 foot

jurisdictional area, with roads and agriculture (livestock) uses on the southern end the shoreline, and 80.6% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach comprising 9.2% of the area. The habitat rating average of 55.4 is due the number of habitat types, the horizontal and vertical habitat features and very limited alterations. The uplands are primarily a mix dryland agriculture, cliffs, talus and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 214.9 acres, with 0% of public lands. Impervious surfaces cover 0.3% of the area (roads).

Polygon Species Habitat	**Acres**
Cliffs/bluffs	22.9
Mule Deer	25.4
Sage Grouse	66.7
Waterfowl Concentrations	2
Wetlands	1.1

Grimes Lake 2
This reach has a length of approximately 1 mile, and contains 45.2 acres and forms the northeast end of the lake. The shoreline primarily shrub steppe habitat (87%) that extends well beyond the 200 foot jurisdictional area, and 92.1% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI), some isolated, in the reach comprising 13.6% of the area. The habitat rating average of 81 is due the number of habitat types, the horizontal and vertical habitat features and no visible shoreline alterations. The uplands are primarily a mix dryland agriculture, cliffs, talus and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 176 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Cliffs/bluffs	1.9
Mule Deer	33.7
Riparian Zones	8.4
Sage Grouse	51.3
Waterfowl Concentrations	1.2

PHS Points- one prairie hawk nesting site.

Grimes Lake 3
This reach has a length of approximately 1.2 miles, and contains 52.9 acres and forms the west side of the lake. The shoreline has extensive cliff, talus and rocky shrub steppe habitats that extend well beyond the 200 foot jurisdictional area, has two isolated ponds, and 91.4% soils of a geologic hazard as defined under the DCC. There are five wetland types (NWI) in the reach comprising 12% of the area. The habitat rating average of 81 is due to the number of habitat types, the horizontal and vertical habitat features and no visible shoreline alterations. The uplands are primarily a mix dryland agriculture, cliffs, talus and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 135.1 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Cliffs/bluffs	9.7
Mule Deer	43
Riparian Zones	0.5
Sage Grouse	125.1
Waterfowl Concentrations	1

Grimes Lake 4
This reach has a length of approximately 0.8 miles, and contains 33.3 acres and forms the southeast side of the lake. The shoreline is primarily shrub steppe habitat (70%) that extends well beyond the 200 foot jurisdictional area, and 95.3% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach comprising 27% of the area. The habitat rating average of 32.7 is due to the number of habitat types, the horizontal and vertical habitat features but with some roads and limited alterations at the south end. The uplands are primarily a mix dryland agriculture, cliffs, talus and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 174.7 acres, with 0% of public lands. Impervious surfaces cover 3.7% of the area (roads).

Polygon Species Habitat	**Acres**
Mule Deer	12.9
Sage Grouse	45.1

Waterfowl Concentrations	20.4
Wetlands	20.2

Bennett Lake
This is an alkaline lake that is intermediate lake between Grimes and Jameson Lakes, connected by a stream channel and wetlands that overlap the jurisdictional areas. The lake has one reach that has a length of approximately 1.7 miles, and contains 167.3 acres. The shoreline has extensive wetlands that extend well beyond he 200 foot jurisdictional area (hence the large number of acres), has a small dam on the south end (built in the 1930s), with roads and agriculture (livestock) uses on/near the shoreline, and 80.6% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach. The habitat rating average of 9.7 is due to the amount roads that limit the horizontal and vertical habitat features. The uplands are primarily a mix of pasture, dryland agriculture, cliffs, talus and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 253.9 acres, with 9.5% of public lands. Impervious surfaces cover 1.7% of the area (roads).

Polygon Species Habitat	**Acres**
Cliffs/bluffs	15.5
Mule Deer	101.3
Sage Grouse	257.5
Waterfowl Concentrations	70.8
Wetlands	70.8

Jameson Lake 1
This is an alkaline lake that is the lower most of the three lakes in this area connected by a stream channel and wetlands to Bennett Lake. This reach has a length of approximately 1.7 miles, and contains 75.9 acres and forms the southeast side of the lake. The shoreline has extensive alterations, including 2 boat launches, a recreation resort, a paved road which is immediately adjacent to the water front, and a state recreational area with facilities. Ninety-seven percent of the soils are a geologic hazard for development as defined under the DCC. There are four wetland types (NWI) in the reach comprising 4.4% of the area. The habitat rating average of 6.2 is due to the number extent of the alterations and limited habitat functions. The uplands are primarily shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 105.9 acres, with 87% of public lands. Impervious surfaces cover 30% of the area (22.7% roads).

Polygon Species Habitat	Acres
Cliffs/bluffs	1
Mule Deer	72.6
Sage Grouse	148.2
Waterfowl Concentrations	2.8

Jameson Lake 2
This reach has a length of approximately 3.2 miles, and contains 143.1 acres and forms the west side of the lake. The shoreline has extensive cliff, talus and rocky shrub steppe habitats that extend well beyond the 200 foot jurisdictional area, has a couple of islands, and 81.9% soils of a geologic hazard as defined under the DCC. There are five wetland types (NWI) in the reach comprising only 2% of the area. The habitat rating average of 74.6 is due to the number of habitat types, the horizontal and vertical habitat features and no visible alterations. The uplands are primarily a mix dryland agriculture, cliffs, talus and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 123.4 acres, with 50% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	Acres
Cliffs/bluffs	49.2
Mule Deer	90.5
Sage Grouse	185.4
Waterfowl Concentrations	3.4

PHS Points- two prairie hawk nest sites and one peregrine falcon, unknown use.

Jameson Lake 3
This reach has a length of approximately 1.3 miles, and contains 58.3 acres and forms the north end of the lake. The shoreline has extensive alterations, including 2 docks and a boat launch, a recreation resort, and a network of roads which many are immediately adjacent to the water front. Forty-two percent of the soils are a geologic hazard for development as defined under the DCC. There are five wetland types (NWI) in the reach comprising 27% of the area. The habitat rating average of 3 is due to the extent of the alterations and limited habitat functions. The uplands are primarily wetlands to the north and shrub steppe, cliff and talus to the east and west. The area is zoned entirely

as Rural Resource 20. The average parcel size is 277.8 acres, with 0.5% of public lands. Impervious surfaces cover 19% of the area (4.2% roads).

Polygon Species Habitat	**Acres**
Cliffs/bluffs	4.1
Mule Deer	53.9
Sage Grouse	97.8
Waterfowl Concentrations	0.3

Jameson Lake 4
This reach has a length of approximately 1.5 miles, and contains 67 acres and forms the east side of the lake. The shoreline has extensive cliff, talus and rocky shrub steppe habitats that extend well beyond the 200 foot jurisdictional area, and 99.6% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach comprising only <1% of the area. The habitat rating average of 76.5 is due to the number of habitat types, the horizontal and vertical habitat features and no visible alterations. The uplands are primarily a mix dryland agriculture, cliffs, talus and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 190.3 acres, with 48% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Cliffs/bluffs	25.8
Mule Deer	40.9
Sage Grouse	108
Shrub steppe	6.6
Waterfowl Concentrations	0.3

Other plateau lakes (Kettle Lakes)
Most of these lakes are alkaline in water type, and become much more so during the mid summer to early fall. These lakes were created by depressions left during glaciation and are commonly called pothole lakes, similar to those in other parts of the Columbia Basin. Throughout this region most lakes are used heavily by migratory birds, mostly waterfowl. Many of the lakes are used by deer and livestock for water, although when the alkalinity raises those that provide lower alkalinity or freshwater get more intensively used.

Black Lake 1
This lake has two reaches and is has a water quality that is weakly alkaline; reach one has a length of approximately 0.3 miles, and contains 13 acres. Reach one was separated because of its unique habitat features on the southwest side. The shoreline is comprised of 90% wetlands with a large tree component and talus/rock habitats, has no visible shoreline alterations, and 99% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach. The habitat rating average of 67.5 is due to the high amount of wetland area, long horizontal and vertical habitat features, but an unusual composition of habitat types and no roads. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 360.7 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Mule Deer	60.1
Riparian Zones	0.7

Black Lake 2
This reach is almost completely shrub steppe (92%) that has a length of approximately 1.3 miles, and contains 68.7 acres. The shoreline is has some wetlands, has no visible shoreline alterations, and 90.5% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach. The habitat rating average of 55.4 is due to the long horizontal and vertical habitat features, number of habitat types and few roads. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned entirely as Rural Resource 20. The average parcel size is 370.9 acres, with 0% of public lands. Impervious surfaces cover 1.8% of the area (road).

Polygon Species Habitat	**Acres**
Mule Deer	68.7

Cornehl Lake
This lake has one reach that has a length of approximately 0.9 miles, and contains 179.7 acres. The shoreline has extensive wetlands that extend well beyond he 200 foot jurisdictional area (hence the large number of acres), has few, if any, shoreline alterations, and 90.3% soils of a geologic hazard as defined under the DCC. There are five wetland types (NWI) in the reach. The habitat rating average of 23.1 is due to the high amount of wetland area, long horizontal and vertical habitat features, but a low number of habitat types and few roads. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (91 and Dryland Agriculture (9%). The average parcel size is 218.8 acres, with 0.1% of public lands.

Impervious surfaces cover 0.2% of the area (road at north end). Given the extent of wetlands and some cliff and talus habitat in the nearby uplands, the habitat probably has a much higher value to wildlife than the rating would indicate.

Tim Behne, Foster Creek Conservation District, visited Cornehl Lake with land owner Gene Wimerskirch. He said the lake used to be much smaller and that hay was cut on the west end (now under water) in the old days. He also mentioned that the Calvary camped there one winter during the last of the Indian populations in the area. This lake may be the reason for the high temperatures in West Foster Creek.

Polygon Species Habitat	**Acres**
Sage Grouse	201.8
Sharp-tailed Grouse	23.8
Waterfowl Concentrations	178
Wetlands	178

Elbow Lake
This lake has one reach and it has a water quality that is strongly alkaline and subject to drying up during dry seasons/years; the length is approximately 0.9 miles, and contains 55 acres. The shoreline is comprised of 88% shrub steppe with the remainder wetlands, has no visible shoreline alterations, and 30.3% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach. The habitat rating average of 6.6 is due to the limited number of habitat types and proximity to a major road. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (51%) and Dryland Agriculture (49%). The average parcel size is 644.3 acres, with 55% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Sage Grouse	74.9
Waterfowl Concentrations	22.9

Haynes Lake
This lake has one reach is 1.5 miles in, and contains 103.3 acres. The shoreline is comprised of 39% shrub steppe with the remainder extensive wetlands, has one dock, and 60.6% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach. The habitat rating average of 5.6 is due to the limited number of habitat types and limited vertical extent of habitat. The uplands are primarily a mix of

dryland agriculture and shrub steppe. The area is zoned as Dryland Agriculture. The average parcel size is 124.4 acres, with 0% of public lands. Impervious surfaces cover 0% of the area. A comment in the visioning document stated that there are many turtles in this lake.

Polygon Species Habitat	**Acres**
Sage Grouse	147.6
Sandhill Crane	295.3

Klinkhammer Lakes
This lake has one reach, although there are actually two lakes that are virtually identical in characteristics and is has a water quality that is alkaline; the length is approximately 2.1 miles, and contains 104.7 acres. The shoreline is comprised of 88% shrub steppe with the remainder wetlands, has no visible shoreline alterations, and 36% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach. The habitat rating average of 24 is due to the limited number of habitat types. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (99.5%) and Dryland Agriculture (0.5%). The average parcel size is 265.9 acres, with 1.7% of public lands. Impervious surfaces cover 0% of the area. Historically there was an attempt to stock fish, but local area residents conclude that survival wasn't likely due to the alkalinity. This lake and several others in the area were historically used by local residents for ice skating before most of the homesteads were abandoned.

Polygon Species Habitat	**Acres**
Sage Grouse	188.5
Sandhill Crane	188.3

Smith Lake
This lake has one reach and is of fresh water quality and spring fed (2004 photo indicates an algae bloom); the length is approximately 1 mile, and contains 58.6 acres. The shoreline is comprised of 83% shrub steppe, has no visible shoreline alterations, and 89.1% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach (10.2% of the area). The habitat rating average of 34.1 is due to the number of habitat types, long horizontal and vertical habitat features, and proximity to a major road. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (56.5%) and Dryland Agriculture

(43.5%). The average parcel size is 603.2 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	Acres
Waterfowl Concentrations	109.1

Stallard Lake
This lake has one reach of 0.9 miles, and contains 71.3 acres. The shoreline is comprised extensive wetlands and 76.6% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach. The habitat rating average of 4.8 is due to the limited number of habitat types and limited vertical extent of habitat. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Dryland Agriculture. The average parcel size is 90.1 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	Acres
Sage Grouse	105.4
Sandhill Crane	210.8

Unnamed 29-29-2 1
This lake has two reaches and is has a water quality that is alkaline; the length is approximately 0.5 miles, and contains 29.6 acres. The shoreline is comprised of dryland agriculture, shrub steppe and 17.4% wetlands, has no visible shoreline alterations, and 92.6% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach. The habitat rating average of 5.3 is due to the limited number of habitat types and proximity of dryland agriculture. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (10%) and Dryland Agriculture (90%). The average parcel size is 520.8 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	Acres
Waterfowl Concentrations	24.5

Unnamed 29-29-2 2
This reach has a length of approximately 0.6 miles, and contains 35.4 acres. The shoreline is comprised of dryland agriculture, shrub steppe and 61.6% wetlands, has no visible shoreline alterations, and 88.4% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach. The habitat rating average of 13.5 is due to the limited number of habitat types and proximity of dryland agriculture.

The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (23%) and Dryland Agriculture (77%). The average parcel size is 501.1 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Waterfowl Concentrations	2.5

Unnamed 29-29-22
This lake has one reach and is of alkaline water quality; the length is approximately 1 mile, and contains 57.8 acres. The shoreline is comprised of 89% shrub steppe, has no visible shoreline alterations, and 23.7% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach (10.6% of the area). The habitat rating average of 9.9 is due to the number of limited habitat types, long horizontal and vertical habitat features, and proximity to a major road. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Dryland Agriculture. The average parcel size is 160.3 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Sage Grouse	88.9
Waterfowl Concentrations	35.6

PHS Points- one white tailed jack rabbit.

Unnamed 30-29-36
This lake has one reach and is of alkaline water quality; the length is approximately 0.9 miles, and contains 59.8 acres. The shoreline is comprised of 56% shrub steppe, has no visible shoreline alterations, and 45.7% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach (44% of the area). The habitat rating average of 9.5 is due to the limited number of habitat types, long horizontal and vertical habitat features, and proximity to a major road. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (90%) and Dryland Agriculture (10%). The average parcel size is 230.3 acres, with 20% of public lands. Impervious surfaces cover 0.2% of the area.

Polygon Species Habitat	**Acres**
Waterfowl Concentrations	28.8

PHS Points- one peregrine falcon, perching use.

Unnamed 30-29-36b
This lake has one reach and is of alkaline water quality, although likely less than many other lakes as the 2004 photo indicates an algae bloom, characteristic of several freshwater lakes in the same photo (e.g. Smith Lake). The length is approximately 1 mile, and contains 58.6 acres. The shoreline is comprised of 83% shrub steppe, has no visible shoreline alterations, and 89.1% soils of a geologic hazard as defined under the DCC. There are four wetland types (NWI) in the reach (10.2% of the area). The habitat rating average of 34.1 is due to the number of habitat types, long horizontal and vertical habitat features, and proximity to a major road. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (56.5%) and Dryland Agriculture (43.5%). The average parcel size is 603.2 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	**Acres**
Waterfowl Concentrations	27.1

Wilson Lake 1
This lake has two reaches and is of unknown water quality; the length of this reach is approximately 0.5 miles, and contains 25.9 acres. The shoreline is almost completed altered by dryland agriculture, a farm in close proximity to the shoreline, and 67.5% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach (<1% of the area). The habitat rating average of 0.1 reflects the highly altered shoreline. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (31%) and Dryland Agriculture (69%). The average parcel size is 120.6 acres, with 0% of public lands. Impervious surfaces cover 6.6% of the area (4.6% roads).

Polygon Species Habitat	**Acres**
Waterfowl Concentrations	49.9

Wilson Lake 2
The length of this reach is approximately 1 mile, and contains 51.7 acres. The shoreline is comprised of 14% shrub steppe, and 66% soils of a geologic hazard as defined under the DCC. There are three wetland types (NWI) in the reach (59% of the area). The habitat rating average of 81 is due to the number of habitat types and long horizontal and vertical habitat features. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (40%) and Dryland Agriculture (60%). The average parcel size is 203.3 acres, with 0% of public lands. Impervious surfaces cover 0% of the area. Although this reach rated very high on habitat functions,

because it is small and the amount of alteration on the north side (reach 1) would substantially reduce its value for wildlife habitat functions.

Polygon Species Habitat	Acres
Waterfowl Concentrations	4.3

Unnamed Lake T29 R28 S25
This lake has one reach and is has a water quality that is alkaline and subject to dramatic changes in lake levels between wet and dry seasons/years; the length is approximately 1.0 mile, and contains 56 acres. The shoreline is comprised of 100% shrub steppe, has no visible shoreline alterations, and 85% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach. The habitat rating average of 54 is due to the lack of roads, vertical and horizontal continuity of habitat, but has a limited number of habitat types. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Dryland Agriculture (100%), likely in CRP. The average parcel size is 480 acres, with 0% of public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	Acres
Sage Grouse	56
Waterfowl Concentrations	20.5

Unnamed Lake T29 R28 S31
This lake has one reach and is has a water quality that is alkaline and subject to dramatic changes in lake levels between wet and dry seasons/years; the length is approximately 0.7 miles, and contains 46 acres. The shoreline is comprised of 100% shrub steppe, has no visible shoreline alterations, and 30% soils of a geologic hazard as defined under the DCC. There are two wetland types (NWI) in the reach. The habitat rating average of 54 is due to the lack of roads, vertical and horizontal continuity of habitat, but has a limited number of habitat types. The uplands are primarily a mix of dryland agriculture and shrub steppe. The area is zoned as Rural Resource 20 (60%) and Dryland Agriculture (40%). The average parcel size is 323 acres, with 50% in public lands. Impervious surfaces cover 0% of the area.

Polygon Species Habitat	Acres
Sage Grouse	46

A.5 Public access

The public access for shorelines in Douglas County is most extensive on the Columbia River. The discussion below separates the river into pools and lists lakes that have established public access. Those lakes not listed do not have any developed public access, although many have public lands near or adjacent to them that allows limited remote access. On the Columbia River, the inventory is limited to the Douglas County side, but there will be discussion of where more developed areas either in Grant, Okanogan or Chelan County exist.

Wanapum Pool
There are no developed public access areas to the water within Douglas County, although there are two areas with undeveloped access off of Spanish Castle Road. There is a private community recreational facility for boating near Trinidad (Columbia Cliffs), and just outside of the County is Crescent Bar (Grant County) - a major resort area with privately owned publicly accessible boating facilities. The Chelan County PUD has a boat ramp on the Chelan County side just below Rock Island Dam, but is not for public use.

Rock Island Pool
There is one major boating/recreational facility on the Douglas County side- Hydro-Park. There is also one undeveloped site just above Odabashian Bridge. On the Chelan County side there are two additional facilities within the City of Wenatchee- Orondo Street Boat Launch and Confluence State Park.

Rocky Reach (Lake Entiat)
Public facilities include Lincoln Rock Park, Orondo Park, Daroga Park, and Beebe Park. Community facilities include Bauer's Landing and Sun Cove (Lake Entiat Estates). The City of Entiat, Chelan Falls, and at least one more facility in Chelan County- the Wenatchee Boat Club.

Wells Pool (Lake Pateros)
One public facility, Marina Park in the City of Bridgeport. Other facilities in Okanogan County exist at Pateros and Brewster.

Rufus Woods
Two public facilities- one just above Chief Joseph Dam and one remote area that is not a fully developed facility about 7 miles upstream (Brandt's Landing). The only other site is in Okanogan (Seaton's Grove).

Jameson Lake
One major facility managed by WDFW and one smaller developed site owned by Jack's Resort.

Grimes Lake
One site not fully developed.

Banks Lake
The developed sites are all outside of Douglas County, and one possible undeveloped site may exist in the Barker Canyon area. There are numerous sites that are in Grant County- the entire lake is managed by the National Park Service. Developed sites include two on the south end- one on each side of Dryfalls Dam, two minor facilities along the east shore, and two major facilities near Electric City.

Analysis and justification for removal of Moses Coulee and Atkins Lake from the RSMP

Moses Coulee and the Shoreline Management Act

The purpose of this paper is to create a scientifically justified and reasonable discussion for removing Moses Coulee from the Columbia River to the mouth of Douglas Creek as defined in WAC 173-18-130.

The Moses Coulee Water Resource Inventory Area (WRIA) 44 is located close to the geographic center of Washington State in the “Big Bend” area of the Columbia River. WRIA 44 is approximately 1,213 square miles watershed (776,222 acres). It extends southwest from central Douglas County before emptying into the Columbia River at River Mile 447.0). A small portion of WRIA 44 lies within Grant County. The primary tributaries in the watershed are Douglas Creek, Rattlesnake Creek and McCarteney Creek. There are two large closed basin lakes in the upper end of the watershed- Jameson and Grimes Lakes.

Regulatory framework
In WAC 173-18-040, Streams and rivers further defined shorelines of statewide significance as:

> 2. (b) Eastern Washington. The following provisions describe either of the following points on those rivers in Eastern Washington, whichever is farther upstream;
>
> (i) The point at which the mean annual flow exceeds two hundred cubic feet per second, or
>
> (ii) The lowest extremity of the first three hundred square miles of drainage area east of the crest of the Cascade Range; provided that either of said points which is utilized is within the jurisdiction of chapter 90.58 RCW.

(iii) The following provisions additionally list said river in all counties below said point through which said river passes.

It is 2b(ii) that included Moses Coulee in the Shoreline Master Program based on it's watershed size at what is called a boundary point, which is located at the confluence of Douglas Creek and Moses Coulee (Sec. 36, T23N, R23E) and extends to the Columbia River.

Recent studies
USGS
The USGS, in cooperation with Ecology, began updating upstream boundary points in 1990. In 1971 the State was divided into 13 hydrologic regions which were also used in this study. From 1990 through 1998, the USGS updated upstream boundary points for all northeastern and western Washington streams and rivers for which Ecology has regulatory responsibility.
Most of the streams and rivers of interest in their study area do not have streamflow records so using a direct-measurement approach for determining upstream boundary points was not feasible because (1) the use of stream-gauging records to determine mean annual discharges would require continuous operation of a number of new streamflow gages on each stream over a period of years, (2) the locations at which to measure the streams would not be known beforehand, and (3) the cost of operating the large number of gages required would be economically impractical.

The 1971 USGS study concluded that only drainage area and mean annual precipitation were needed in order to determine mean annual discharge at ungauged sites (David H. Appel, U.S. Geological Survey, written commun., 1971).

There were several steps to determining the equation for putting boundary points in, but this particular step from their report was the key:

> The point on a river at which the mean annual discharge was determined to be 200 cfs was designated as the upstream boundary of the shoreline of statewide significance for the river unless the corresponding drainage area at that point was greater than 300 square miles. In the latter case, steps 1-4 were repeated at upstream trial points until the location of the point having a drainage area of 300 sq. mi. was determined. That point was designated as the upstream boundary point for the shoreline of statewide significance.

The data used for the modeling effort included Douglas Creek; USGS site 4612463000 Douglas Creek near Alstown depicted 4.18 cfs mean annual flow, 10.00 inches annual precipitation, 99.9 square miles drainage area. Data sets summarized from 1949–55, 1963–68 data.

What was not considered was that some sites had no records as no flow occurred on a continuous basis (therefore no gage records). Such is the case with Moses Coulee. USGS stream naming conventions and graphical stream representations on

topographic maps also confirm no flow occurring, only a dry channel, which remains unnamed up to the point where Douglas Creek enters Moses Coulee.

PGG
Pacific Groundwater Group describes Douglas Creek/Moses Coulee (PGG 2003):

> Douglas Creek winds north-south across most of WRIA 44. The streambed initially consists of fine sediment, but enters a bedrock valley not far along its course. The Creek flows through the valley for approximately half of its total length and then enters Moses Coulee where the substrate changes to coarse alluvium. Within Moses Coulee the creek flow recharges completely to the underlying groundwater and the creek does not discharge to the Columbia River.
>
> Rattlesnake Creek trends east-west across WRIA 44. The creek can be roughly divided into three sections based on substrate conditions; the eastern portion consists of coarse alluvium, the middle is bedrock, and the west end is undefined alluvium. The stream likely loses water on the western, downstream reach and loses all of its water to the underlying groundwater before reaching Douglas Creek.

In their modeling exercise, mean annual flow of Douglas and Rattlesnake Creeks combined, which would be at the boundary point, is 14.4 cfs. This exercise used USGS data models as well, but takes into account more variables versus the model used by USGS and WDOE in the previous discussion. PGG also notes that the aquifer is discontinuous, that is, the flows entering Moses Coulee are not supported by the aquifer, but rather, the water drains through the alluvium into the aquifer far below the surface.

In Moses Coulee historical accounts some flow has occurred in wet years expressed near the mouth as the elevation and depth of aquifer decline rapidly. In addition, historically there have been years where large flood events from weather events (rain or Chinook winds) combined with saturated soil or frozen soils with snow conditions that likely exceeded 20 cfs, but only for a short duration (1-5 days) documented in the Douglas County Hazard Mitigation Plan.

Foster Creek Conservation District
Data collected by Foster Creek Conservation District depicts a lower mean annual flow, at approximately 12 cfs in Douglas Creek near Moses Coulee for the last several years, although the region as a whole has been experiencing drought-like conditions for several years.

Summary
Given this abundance of information, it would seem prudent to remove Moses Coulee from consideration in the revision of the Douglas County Regional Shoreline Master Program. In addition, there are other regulatory considerations that would usurp regulations under the Plan. There are several critical areas ordinances to protect any

isolated resources, including geological hazards, frequently flood areas and fish and wildlife conservation areas. There is also the Douglas County Flood Hazard Management Plan which discusses remediation for flooding events which is more suitable for the conditions occurring within Moses Coulee.

Within the Shoreline Management Act there are criteria to provide for reasonable access to water and water-related uses. Within Moses Coulee (for the channel) there are no water-related uses as no water exists within the Coulee for these uses to occur.

References:

Bartu, K., and C. Andonaegui. 2001. Salmon and steelhead habitat limiting factors report for the Foster and Moses Coulee watersheds Water Resource Inventory Areas (WRIA) 50 and 44. Report prepared by the Washington State Conservation Commission, Olympia, WA, and the Foster Creek Conservation District, Waterville, WA. Final report. March, 2001. 114p + appendices.

Douglas County Transportation and Land Services. Douglas County Hazard Mitigation Plan. 2003.

PGG (Pacific Groundwater Group, Montgomery Water Group, Inc., R2 Resource Consultants). 2003. WRIA 44/50 final phase 2 basin assessment. Prepared for Foster Creek Conservation District, Waterville, WA.

NPCC (Northwest Power and Conservation Council). 2004. Upper Middle Mainstem Subbasin Plan. Northwest Power and Conservation Council, Portland, OR.

USGS, 2003. *Higgins, Johnna L*. Determination of Upstream Boundary Points on Southeastern Washington Streams and Rivers Under the Requirements of the Shoreline Management Act of 1971. Prepared in cooperation with the Washington Department of Ecology, Tacoma, Washington. Water-Resources Investigations Report 03-4042.

Atkins Lake

Atkins Lake is an intermittent lake that has not had water in it since the early 1980s (Jim Davis, personal communication, May, 2006). Jim Davis has lived (easy viewing distance) near the lake for all of his life, close to 60 years, and out of those 60 years, he thought maybe 12 years the lake has had water in it. He did acknowledge that early in his childhood there was water in it and some fringe brush vegetation (see 1947 aerial). His observation is that early farming practices (horse drawn) had minimal effects on the water retention in the soil (retained), and as equipment improved erosion and runoff increased, thereby allowing more water to enter the basin. In the last 10-20 years tillage practices and CRP have likely increased soil moisture/water retention, therefore decreasing runoff and the ability for water to gather in low lying areas like Atkins Lake. Indeed, discussions with various farmers and ranchers in the Douglas County Watershed Planning Unit have stated similar observations with area lakes. He

mentioned the soils were somewhat impermeable as well. He observed that the last time water stayed in the lake was about 1982.

From Douglas County PUD website:
Jim Davis is a fourth generation wheat farmer, raised on the family farm in the Saint Andrews area of Douglas County where he presently resides. A 1964 graduate of Coulee City High School, Jim received a Bachelor of Arts degree in Education from Eastern Washington University. A graduate of the Washington Agriculture and Forestry Education Foundation Leadership Program, Jim is also a Kellogg Fellow in Food and Agriculture policy at Resources for the Future, a Washington, DC research foundation.

No local, state or federal agency data can be found related to the lake, water levels or water quality. Several aerial photos, 1947, 1994, and 2004 show no water, and in fact depict much of the lake bottom being farmed. A field trip in May 2006, the lake was all under cultivation except for a very small area on the west side with some basin wild rye and other steppe grasses present. All of these indicators reflect a lake not having resources warranting inclusion in the Shoreline Master Program for Douglas County. Other mechanisms, such as frequently flooded regulations are more applicable to the circumstances to this intermittent lake.

Appendix B. Restoration plan

B.1 Introduction

State guidelines establish that local governments include a real and meaningful strategy to address shoreline restoration. *"Restoration means the reestablishment or upgrading of impaired ecological shoreline processes or functions. This may be accomplished through measures including, but not limited to, re-vegetation, removal of intrusive structures, and removal or treatment of toxic materials. Restoration does not imply returning to aboriginal or pre-European settlement conditions."* (WAC 173-26-020).

Restoration differs from protection measures established by the shoreline master program. Protection measures are intended to maintain baseline functions and values. Restoration occurs mainly via goals, policies, and voluntary or incentive based mechanisms.

This Plan establishes a restoration goal, objectives, and policy priorities to actively encourage and facilitate restoration in the county. Participation in ongoing restoration programs by the cities and the county, where appropriate, and support for these programs is identified as an important component of this plan. Opportunities have been identified for further development of educational, voluntary and incentive based restoration approaches. Monitoring these ongoing efforts for the 213 miles of shoreline in Douglas County will be an ongoing process with benchmarks coinciding with shoreline master program updates every 7 years. The results of this monitoring will assist the cities and the county in updating and managing their approach to the restoration of identified degraded shoreline functions.

B.2 Purpose and scope

This Plan has been prepared to comply with the state's SMP guidelines for restoration planning (WAC 173-26-201 (2) (f)). The guidelines recommend that restoration plans:

- Identify degraded areas, impaired ecological functions, and sites with potential for restoration;
- Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;
- Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals;
- Identify additional projects and programs needed to achieve local restoration goals, and implementations strategies, including identifying prospective funding sources for those projects and programs;
- Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals; and
- Provide mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately

review the effectiveness of the projects and programs in meeting the overall restoration goals.

This restoration plan is focused on tools such as economic incentives, broad funding sources such as Salmon Restoration Funding, volunteer programs, and other strategies. The guidelines establish that since restoration planning must reflect the individual conditions of a shoreline, restoration planning provisions will vary based upon:

- Size of jurisdiction
- Extent and condition of shorelines
- Availability of grants, volunteer programs, and other tools
- The nature of the ecological functions to be addressed

The approach chosen by the cities and county is reflective of ongoing efforts and programs in the region; as well as a commitment by the jurisdictions to move forward with additional educational and incentive based programs.

B.3 Priority needs/areas

Background and methods

Identification of sites with potential for restoration

The Inventory and Characterization section of the Shoreline Master Program, Douglas County Watershed Plan, and the two conservation districts (Foster Creek and South Douglas) have all identified a number of proposed restoration projects and areas with potential for restoration. Unfortunately the Douglas County Watershed Plan did not address the Columbia River. However, broad countywide programs were included that could affect the river. The plan addresses upland processes, primarily agricultural practices and programs, such as the Conservation Reserve Program (CRP), to reduce erosion and sediment transport. Erosion and sediment transport likely affect some of the upland lakes; i.e. there are very few areas of shoreline uses on the lakes besides agriculture. These programs have been successful in reducing these effects, although direct monitoring of the lakes does not occur except for Banks, Jameson and Grimes lakes (see SMP introduction). Jameson and Grimes both have more local attention as they support fisheries and have recreational resources developed. The three public utility districts have identified areas where erosion is occurring along the Columbia River and are included in the discussion of potential restoration areas.

Fish passage restoration potential only applies to the Columbia River dams (the only river in the SMP). The responsibility for passage, or mitigation for, lies with the operators of each dam; i.e. the three PUD's and US Army Corps of Engineers and is beyond the scope of this Plan.

The local and state salmon recovery plans list the Columbia as a low priority for restoration projects such that little interest has been generated to identify sites in need of restoration.

Implementation and construction of proposed restoration projects are carried out by the respective county agencies, utility and conservation districts, municipalities, or private interests. In addition, State and Federal agencies such as the Washington Department of Fish and Wildlife, the US Fish and Wildlife Service, and others may be involved in direct project implementation, or as a partner in a multi-jurisdictional effort.

Public versus private lands
Nearly 85% of Douglas County is privately owned, although within the shoreline jurisdictional area approximately 40% of the land is owned by public agencies, primarily the public utility districts and Washington State Department of Transportation. Specific areas of public lands on the Columbia River have been designated natural, mostly PUD owned, to ensure minimal potential alteration, which is consistent with PUD goals and objectives. Most of this occurs in Wells and Wanapum pools. In addition, Banks Lake is almost entirely publicly owned and designated natural. Most of the upland lakes have also been designated natural as they are relatively inaccessible and alkaline in nature.

To provide a general countywide overview of project types, projects can be categorized as follows:

I. Develop and maintain programs to protect and restore shoreline natural resources and functions – Educate and provide assistance to property owners and the general public on how to protect and restore habitat and shoreline functions.

II. Restore riparian areas – Activities include planting of riparian and upland vegetation, maintenance, weeding and invasive weed control.

III. Protect and restore sediment processes – Protect vegetative cover, control runoff from roads, remediate landslides, and enhance bridges.

IV. Protect and Restore wetlands – Restore hydrology and vegetation in freshwater, estuarine and adjacent wetlands.

V. Acquire/remove shoreline structures – Acquire and remove bulkheads, armoring, marinas, piers, and other structures to restore shoreline function.

VI. Protect Existing Habitat – protect through environment designations and regulations.

Priorities for restoration activities should be focused in:
1. Areas that extend or connect contiguous functioning shorelines
2. Areas where there is functioning upland habitat
3. Areas where uplands are not disconnected by roads, railroads or other obstructions within the 200 foot jurisdictional area
4. Areas currently impaired in an area proposed for development.

Areas of potential restoration and suggested approaches

Interior Lakes

The interior lakes not specifically listed are considered functioning and not at immediate risk by development or alterations. Many have some livestock grazing occurring, and several have dryland agricultural activities upland (above the 200 foot jurisdictional area) that may have some effects to the lakes. Extensive on-going agricultural practice improvements through NRCS and Conservation Districts should retain or improve shoreline ecological functions.

Lakes that are alkaline are designated as a Type 1 wetland within the DCC, receiving the maximum protection as they are considered irreplaceable; i.e. they cannot be duplicated through creation of wetlands.

Banks Lake Shoreline- Barker Canyon area- under management of the National Park Service (Bureau of Reclamation/Banks Lake Equalization Project).
Recreational and environmental improvements have been identified in the Banks Lake Recreation EIS. Accessible areas to Banks Lake are publicly owned and mitigation or restoration lies with the National Park Service.

Jameson Lake

South end- most of the shoreline in the reach is hardened or lined with a road that accesses recreational area(s) along the lake. Much of this area is owned and managed by the WDFW. Where private lands exist in the very southern extent, work could be done with landowners to improve vegetation components and create/improve target areas for recreational use. Some of this may be done through the WDFW and Foster Creek Conservation District.

North end- Continue to improve agricultural practices through programs with the NRCS and Foster Creek Conservation District (FCCD). At the present FCCD is investigating water quality issues identified by the Watershed Planning Unit to identify target(s) for management. The campground area is hardened around the lake. Because of fluctuating lake levels and poor soils, improving the plant community along the banks would prove very difficult.

Grimes Lake- On the south end, grazing of livestock occurs within 200 feet, which may or may not be impairing the shoreline. An in-depth inventory of shoreline conditions should be considered in the near future. Continue to improve agricultural practices through programs with the NRCS and Foster Creek Conservation District.

Bennett Lake- Grazing of livestock occurs within 200 feet, which may or may not be impairing the shoreline. An in-depth inventory of shoreline conditions should be considered in the near future. Continue to improve agricultural practices through programs with the NRCS and Foster Creek Conservation District.

Wilson Lake- Dryland agriculture occurs within 200 feet, which may or may not be impairing the shoreline. An in-depth inventory of shoreline conditions should be

considered in the near future. Continue to improve agricultural practices through programs with the NRCS and Foster Creek Conservation District.

Lake U292902- Dryland agriculture occurs within 200 feet, which may or may not be impairing the shoreline. An in-depth inventory of shoreline conditions should be considered in the near future. Continue to improve agricultural practices through programs with the NRCS and Foster Creek Conservation District.

Rock Island Lakes

Since these lakes came into existence in the early 1970s, impairment is a judgment that does not fit very well. The land under the lakes had been used for other purposes before it became flooded. Over time the shorelines have developed wetland characteristics and currently provide wildlife habitat and recreational resources for the community. A Lake Enhancement Committee was formed several years ago and continues to work to improve the community's resources around the lakes. This process includes shoreline and aquatic weed management and educational opportunities for citizens. In addition, the Washington State Department of Fish and Wildlife stocks fish in most of the lakes to enhance recreational opportunities and the Chelan County PUD has on-going noxious weed control on the shorelines and both are integral with the Lake Enhancement Committee.

Rock Island Lakes circa 1949

Rock Island Lakes 2004

Putters- Non-native vegetation occurs (Russian olive, purple loosestrife etc.), some of which is being controlled by the CCPUD and some through the Rock Island Aquatic Weed Plan (milfoil). Replacement of non-native trees with native species could enhance the wildlife and recreational uses. Gravel extraction operations are underway to improve the lake(s) by increasing the depth, while maintaining commercial viability. This should help with control of milfoil and improve the fisheries. While gravel operations are ongoing the shoreline vegetation is impaired. As gravel operations decline in future years, plantings could improve the condition of the shoreline. Elsewhere the golf course surrounds the lake and has natural vegetation (thin strip) around the shorelines. In future expansion of the golf course, consideration should be given to designing areas compatible with, or an improvement upon, wildlife resources of shoreline areas.

Big Bow- Non-native vegetation occurs (Russian olive, purple loosestrife etc.), some of which is being controlled by the CCPUD and some through the Rock Island Aquatic

Weed Plan (milfoil). Replacement of non-native trees with native species could enhance the wildlife and recreational uses.

Hammond- Non-native vegetation occurs (Russian olive, purple loosestrife etc.), some of which is being controlled by the CCPUD and some through the Rock Island Aquatic Weed Plan (milfoil). Replacement of non-native trees with native species could enhance the wildlife and recreational uses. The golf course surrounds the northern and western part of the lake and has natural vegetation (thin strip) around the shorelines. Future expansion of the golf course should consider designing areas compatible with, or improvement upon, wildlife resources of shoreline areas.

Pit- Designed to be a juvenile fishing pond, there are areas that could be improved through vegetation management compatible with keeping access for fishing. While noted in this section of the SMP, this area's highest priority is in maintaining and/or improving its recreational resource that the community and State of Washington has a considerable investment in.

Columbia River

All three of the public utility districts (and, in Lake Rufus Woods, the US Army Corps of Engineers) expend considerable effort addressing the erosion areas of the pools, improving wildlife habitat within their properties, and managing or providing most of the recreational areas with public shoreline access on the Columbia River. They also are obligated to comply with management plans and mitigation approved by the Federal Energy Regulatory Commission. Most of the impaired areas are associated with the dams themselves (which have been mitigated and are not likely to change), the location of the highways (again, not likely to change for safety and infrastructure reasons), and the areas where agricultural and residential development occurs. Most of these areas are between Rock Island Dam and McNeil Canyon, and on or near Bridgeport Bar.

There are barriers to restoration on the Columbia River, particularly on private lands. There are numerous areas with bluffs, some of which were fill areas cleared for agriculture many years ago, where there is the potential to reconstruct functional shorelines and enhance opportunities for shoreline access. Because of flood easements, federal regulatory requirements and permitting stipulations restoration of these areas is difficult.

Wanapum Pool

There are impaired shorelines just above and below Rock Island Dam, including armoring along the railroad and highway below Rock Island Dam. Because of infrastructure and safety issues remedies are limited in this area. Additional impairment occurs in the Trinidad area where homes with lawns and armoring occur on the shoreline (Columbia Cliffs and Rio Vista).

Rock Island Pool

There are a multitude of lawns/yards that extend to the shoreline, with relatively little armoring. Most irrigated agriculture has a small buffer (<20 feet) along the shoreline, but

the orchards have replaced more upland habitat than shoreline vegetation. Many orchards support waterfowl concentrations as well (grazers). Within the East Wenatchee UGA most of the shoreline has been minimally affected as the WSDOT and CCPUD own the majority of the property. In the most southerly area there are some lawns and a manufactured home park that may be impairing some of the functions. A small area immediately north of Odabashian Bridge has impaired shorelines, a large infestation of knapweed, and is used as an unimproved boat launch. In the Rock Island industrial zoned area there is a large area between the railroad tracks and the shoreline that has impaired conditions. This area is immediately south of the old silica plant where wood chips, up to several feet deep, cover the surface up to the shoreline edge.

Along the Apple Capital Loop Trail there are many areas suitable for restoration by means of noxious weed control. There are also some areas of eroding bluffs just north of 19th street.

Rocky Reach Pool

A multitude of lawns/yards with some armoring extend to the shoreline. There is also significant armoring of the highway. Most irrigated agriculture has a small buffer (<20 feet) along the shoreline, but the orchards have replaced more upland habitat than shoreline vegetation. Many orchards support waterfowl concentrations as well (grazers). Specific areas of impairment are along the shorelines of the LAMIRDS designated- Lake Entiat Estates, Bauer's Landing, Sanford Shores, Columbia Pointe, Longview's Orchards, Lakeview Shores, Orondo, and Desert Shores. Two other areas with potential risk as well as opportunity for restoration are the Twin W Orchards and Beebe Orchard areas. Both have bluffs that are eroding that could potentially be improved both for access and functional shoreline restoration.

Wells Pool

Virtually all of the immediate shoreline is owned by Douglas County PUD. There are several areas of shoreline erosion just upstream from Wells Dam. Most of Bridgeport bar is maintained as wildlife mitigation area with limited access to the Columbia River. Any development, restoration or protection of shorelines in this pool would require coordination and permitting with the Douglas County Public Utilities District.

Lake Rufus Woods

This pool has several areas of impaired shoreline due to erosion, which the US Army Corps of Engineers continues to work on. In addition, the USACOE has developed and maintains wildlife habitat improvements in Lake Rufus Woods. In, and just downstream of, the City of Coulee Dam most of the shoreline is armored to prevent erosion from water and power management of Grand Coulee Dam. WDFW maintains a wildlife area just below this area along the shoreline.

Timelines and funding

Multiple entities are responsible for systematically identifying, securing funding, designing, and constructing projects that provide regionally important watershed scale

improvements to water quality and habitat improvements. The funding and timing with respect to design and construction of potential restoration projects is a continuous process. Funding sources is discussed in the section below.

B.4. Existing efforts and programs

This section lists the programmatic measures within Douglas County designed to foster shoreline restoration, achieve a no-net loss in shoreline and upland ecological processes, functions, and habitats. There are many programs in place that exist in the Upper Columbia Region. Most that occur in Douglas County are related to Natural Resource Conservation Service or Conservation District programs. The jurisdictions do not anticipate leading most restoration projects or programs. However, the SMP represents an important vehicle for facilitating and encouraging restoration projects and programs that could be led by public, private and/or non-profit entities. In addition, a table of potential funding sources has been included to assist with developing projects.

Table 1 below is an Inventory of management programs, sponsors or agencies, area affected by the programs and goals of the programs in the Upper Columbia River Basin.

Table 1. On-going Programs

Management Program	Sponsor/Lead Agency	Area affected by Program	Goal of the Program
Water Management Program	Bonneville Power Administration	Upper Columbia Basin	Establish prescriptions that apply to watershed mitigation projects
Conservation Reserve Program	Natural Resource Conservation Service	Agricultural croplands and farms in Douglas County	Reduce soil erosion on upland habitats through establishment of perennial vegetation on cropland
Conservation Innovation Grants	Conservation Districts	Agricultural croplands and farms in Douglas County	Voluntary program intended to stimulate the development and adoption of conservation approaches and technologies in environmental enhancement and protection
Environmental Quality Incentives Program	Natural Resource Conservation Service	Agricultural croplands and farms in Douglas County	Provides technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and natural resource concerns.
Conservation Securities Program	Natural Resource Conservation Service	All agricultural operations on private croplands, rangeland, pasture land, and orchards in Douglas County	Voluntary program providing financial reward to eligible agricultural operations for stewardship and enhancement practices and activities
Watershed Management Act (2514)	Municipalities in Douglas County and Conservation Districts	WRIAs 44 and 50	Enables the development of planning units that conduct watershed planning and recommend management strategies.
Critical Areas Standards-Wetlands	Douglas County, Cities of Bridgeport, East Wenatchee and Rock Island	County building and development but not agricultural practices	Prevent cumulative adverse environmental effects on water quantity and quality, groundwater, wetlands, and rivers and streams.

Management Program	Sponsor/Lead Agency	Area affected by Program	Goal of the Program
Critical Areas Standards- Fish and Wildlife Conservation	Douglas County, Cities of Bridgeport, East Wenatchee and Rock Island	County building and development but not agricultural practices	Protect unique, fragile, and valuable elements of the environment.
Critical Areas Standards--Frequently Flooded Areas	Douglas County, Cities of Bridgeport, East Wenatchee and Rock Island	County building and development but not agricultural practices	Promotes public health, safety, and welfare by minimizing public and private losses due to flood conditions.
Critical Areas Standards-Geo-hazards	Douglas County, Cities of Bridgeport, East Wenatchee and Rock Island	County building and development but not agricultural practices	Protects the general public and resources from flooding, landslides, or steep-slopes failure.
Road Maintenance Program	Douglas County	All county roads (excluding state and private roads) in Douglas County	Minimize erosion and sediment delivery by implementing various methods.
Stormwater Program Chapter 19.40	Douglas County, City of East Wenatchee	Currently applies only to a portion of East Wenatchee as a utility program in Douglas County	Establish a comprehensive approach to surface and storm-water management that protects property, water quality, aquifers, fish, and increase public education, and preserve natural drainage systems.
Six Year Transportation Plan	Douglas County and cities	Stormwater drainage and management	Review transportation programs for consistency with the Counties Comprehensive Plans.
Douglas County Agricultural HCP	Foster Creek Conservation District	Agricultural croplands, farms, and ranches in Douglas County	Minimize and mitigate the incidental take of threatened and endangered species as a result of typical agricultural activities.
Upper Columbia Regional Fisheries Enhancement Group (RCW 77.95)	Same	Upper Columbia Basin	Enhance salmon and steelhead resources, maximize volunteer efforts, assist the state with achieving their fisheries goals, and help develop project designs
Upper Columbia Salmon Recovery Board	Chelan, Douglas, and Okanogan Counties and Colville Tribes and Yakama Nation	Upper Columbia Basin	Create and implement an ESU-level recovery plan for ESA-listed species in the Upper Columbia Basin
Salmon Recovery Planning Act (Lead Entity- 2496)	Douglas County- via Foster Creek Conservation District	Douglas County	Provides a framework for identifying limiting factors, developing, and funding restoration projects.
Habitat Conservation Plans	Chelan and Douglas County Public Utility Districts	Upper Columbia Basin (upstream from Rock Island Dam)	Achieve “no net impact” on anadromous salmonids

Management Program	Sponsor/Lead Agency	Area affected by Program	Goal of the Program
Northern Pike-minnow Population Reduction Program	Chelan, Douglas, and Grant Public Utility Districts	Mainstem Columbia River	Reduce Pike-minnow predation on smolts
Wells Hydroelectric Project Wildlife Mitigation Program	Douglas County PUD	Upper Basin	Secure, protect, and restore wildlife habitat.
Ecotoxicology and Environmental Fish Health Program and Environmental Assessment Program	NOAA Fisheries	Upper Columbia Basin	Assess the effects of human activities on the health of wild fish.
Conservation Technical Assistance Program	Natural Resource Conservation Service	Upper Columbia Basin	Provide conservation technical assistance to landowners and agencies on planning and natural resource conservation.
Emergency Watershed Protection Program	Natural Resource Conservation Service	Upper Columbia Basin	Undertake emergency measures to protect life and property from floods, drought, and products of erosion.
Farm and Rangeland Protection Program	Natural Resource Conservation Service	Upper Columbia Basin	Protect farm and rangeland and create an easement
Grassland Reserve Program	Natural Resource Conservation Service	Upper Columbia Basin	Protect range and pasture lands from development (subdivision)
Grazing Lands Conservation Initiative	Natural Resource Conservation Service	Upper Columbia Basin	Maintain and improve management, productivity, and health of privately-owned grazing lands
Resource Conservation and Development Program	Natural Resource Conservation Service	Upper Columbia Basin	Accelerate resource conservation and development
Soil and Water Conservation Assistance Program	Natural Resource Conservation Service	Upper Columbia Basin	Provide cost share and incentive payments to farmers and ranchers to address threats to soil, water, and natural resources
Watershed Protection, Watershed Surveys, and Flood Prevention Program	Natural Resource Conservation Service	Upper Columbia Basin	Assist agencies and participants to protect and restore watersheds from erosion, floodwater, and sediments.
Wetlands Reserve Program	Natural Resource Conservation Service	Upper Columbia Basin	Offers landowners opportunities to protect, restore, and enhance wetlands on their properties.
Wildlife Habitat Incentives Program	Natural Resource Conservation Service	Upper Columbia Basin	Provide incentives to develop and improve wildlife habitat on private lands.
Integrated Weed Management Program	Bureau of Land Management	Upper Columbia Basin	Inventory and complete ecological assessments for noxious weeds.

Management Program	Sponsor/Lead Agency	Area affected by Program	Goal of the Program
Land Exchange Program	Bureau of Land Management	Upper Columbia Basin	Provide for acquisition, use, disposal, and adjustment of land resources.
Leave No Trace Program	Bureau of Land Management	Upper Columbia Basin	Promote responsible use of public lands to recreationists participating in human-powered activities
Watchable Wildlife Initiative	Bureau of Land Management	Upper Columbia Basin	Provide wildlife viewing opportunities
Farm Service Agency Conservation Reserve Program	U.S. Department of Agriculture	Upper Columbia Basin	Help agricultural producers to protect environmentally sensitive lands.
Total Maximum Daily Load Program	U.S. Environmental Protection Agency	Upper Columbia Basin	Specify the maximum amount of a pollutant that a water body can receive and still meet water quality standards.
Fish and Wildlife Assistance Program	U.S. Fish and Wildlife Service	Upper Columbia Basin	Restore and maintain the health of fish and wildlife resources
Partners for Fish and Wildlife Program	U.S. Fish and Wildlife Service	Upper Columbia Basin	Assist private landowners restore wetlands and other important fish and wildlife habitats
Fish and Wildlife Mitigation Program	U.S. Fish and Wildlife Service	Upper Columbia Basin	Advocate fish and wildlife habitat needs within the basin
Partners in Flight Program	U.S. Fish and Wildlife Service	Upper Columbia Basin	Manage and conserve neotropical birds
Conservation Planning Program	U.S. Fish and Wildlife Service	Upper Columbia Basin	Work with private landowners, local and state governments, corporations and others to conserve and protect listed and unlisted species on non-Federal lands
Columbia River Regional Initiative/Water Resource Program	Washington State Department of Ecology	Upper Columbia Basin	Develop an integrated state program for managing water resources--to allow access to new water withdrawals while providing support for salmon recovery
Water Quality Program	Washington State Department of Ecology	Upper Columbia Basin	Protect, preserve, and restore water quality
Water Resource Program	Washington State Department of Ecology	Upper Columbia Basin	Manage watersheds, administer water rights, and restore and maintain stream flows.
Columbia River Instream Resource Protection Program	Washington State Department of Ecology	Upper Columbia Basin	Insure the future viability of instream resource values of the mainstem Columbia River, including fish, wildlife, aesthetics, navigation, and hydropower resource values
Aquatic Lands Enhancement Account	Washington State Department of Natural Resources	Upper Columbia Basin	Invest in projects that enhance and protect wildlife and fish habitat

Management Program	Sponsor/Lead Agency	Area affected by Program	Goal of the Program
Washington State Natural Areas Program	Washington State Department of Natural Resources	Upper Columbia Basin	Protect the best remaining examples of many ecological communities and outstanding examples of native ecosystems, habitat for listed species, and scenic landscapes
Conservation Reserve Enhancement Program	Washington State Conservation Commission	Upper Columbia Basin	Provide incentives to restore and improve salmon and steelhead habitat on private lands
Wetland and Fish and Wildlife Activities	Washington State Department of Transportation	Upper Columbia Basin	Maintain or implement activities that limit or reduce impacts to fish and wildlife and their habitats
State Parks Program	Washington State Parks and Recreation Commission	Upper Columbia Basin	Acquire, operate, manage, enhance, and protect a diverse system of recreational, cultural, historical, and natural sites

Potential funding sources

Funding for restoration or protection projects can be accomplished by using a variety of sources and cooperative ventures. On the Columbia River many projects would be coordinated, and potential funded, with one of the public utility districts and/or private landowners. Interior lakes would likely be coordinated with one of the conservation districts and/or private landowners. In either case, funding would need to be sought to assist with these types of projects. Below is a list of some potential funding sources for a variety of restoration or protection projects for shoreline resources.

Table 2. Funding Sources

Grant Name	Sponsoring Entity	Grant Size
Acorn Foundation	Acorn Foundation	$5,000 – 10,000
Aquatic Lands Enhancement Account	Washington State Department of Natural Resources	$10,000 – 1M
Audubon		
Basin-wide Restoration New Starts General Investigation	US Army Corps of Engineers	Varies
City Fish Passage Barrier, Stormwater and Habitat Restoration Program	Washington State Department of Transportation	Varies
Coldwater Conservation Fund (CCF)	Trout Unlimited	Varies

Columbia River Basin Fish and Wildlife Program	Northwest Power and Conservation Commission (BPA)	Varies
Community Based Restoration Program	NOAA Fisheries	$1,000 - $500,000
Community Salmon Fund	National Fish and Wildlife Foundation	To $50,000
Cooperative Endangered Species Conservation Fund	US Fish and Wildlife Service	$1,000 – 14,000
Doris Duke Charitable Foundation	Doris Duke Charitable Foundation	Past Range $125,000 – 3m
FishAmerica Grant Program	FishAmerica Foundation	Varies
Five Star Restoration Program	Environmental Protection Agency	$5,000 – 20,000
FMC Corporation Bird and Habitat Conservation Fund	FMC Corporation and the National Fish and Wildlife Fdn.	Varies
Habitat Conservation	US Fish and Wildlife Service	Varies
Hugh and Jane Ferguson Foundation	Hugh and Jane Ferguson Foundation (Non-Profits only may apply)	$1,000 - $7,500
Landowner Incentive Program	Washington Dept of Fish Wildlife	Up to $50,000
Matching Aid to Restore States Habitat (MARSH)	Ducks Unlimited	Varies
Migratory Bird Conservancy	National Fish and Wildlife Fdn	$10,000 – 60,000
Native Plant Conservation Initiative	Bureau of Land Management, US Forest Service, US Fish and Wildlife Service, National Park Service	$10,000 – 50,000
Non-point Source Implementation Grant (319) Program	Environmental Protection Agency, Washington Dept of Ecology	Varies
North American Wetlands Conservation Act Grants Program	US Fish and Wildlife Service	$100,000 – 1M

Pacific Grassroots Salmon Initiative	National Fish and Wildlife Foundation	$5,000 – 100,000
Planning/Technical Assistance Program	Bureau of Reclamation	Varies
Regional Fisheries Enhancement Groups	Washington Dept of Fish Wildlife	$10,000 – 40,000
Resources for Community Collaboration	Sonoran Institute	Varies
Salmon Recovery Funding Board	Inter-Agency Commission	Varies
Section 204: Environmental Restoration Projects in Connection with Dredging	US Army Corps of Engineers	75% of total project modification costs
Section 206: Ecosystem Restoration Program	US Army Corps of Engineers	65% of total implementation cost
Transportation Environmental Research Program (TERP)	Federal Highway Administration	$20,000 – 50,000
Tributary Fund (HCP)	Chelan and Douglas County Public Utility Districts	Varies
Washington State Ecosystems Conservation Program	US Fish and Wildlife Service	$500 – 26,000
Western Community Stewardship Forum	Sonoran Institute	Varies
Wetland Protection Restoration and Stewardship Discretionary Funding	Environmental Protection Agency	$5,000 – 20,000

Incentive Programs

Consider a tax/fee system to directly fund shoreline restoration measures. One possibility is to have the County craft a preferential tax incentive through the Public Benefit Rating System administered by the County under the Open Space Taxation Act (RCW 84.34) to encourage private landowners to preserve and restore natural shore-zone features for "open space" tax relief. DOE has published a technical guidance document for local governments who wish to use this tool to improve landowner stewardship of natural resources. The guidance in this report provides "technically based property selection criteria designed to augment existing open space efforts with

protection of key natural resource features which directly benefit the watershed. Communities can choose to use any portion, or all, of these criteria when tailoring a Public Benefit Rating System to address the specific watershed issues they are facing."

B.5. Restoration goals and policies

The governing principals of the shoreline update guidelines require cities and counties containing shorelines with impaired ecological functions to provide goals and policies to guide the restoration of those impaired shorelines. The regional shoreline staff and advisory committee compiled a list of potential restoration sites using data obtained during the inventory phase of the master program update, which identified impaired shoreline areas. Ongoing restoration efforts were included with the inventoried sites to create a comprehensive list of potential restoration opportunities. General and specific goals and policies have been developed and are listed below to address restoration of these various areas.

Restoration Prioritization

Priority should be given to restoration actions that:

1. Restore/retain connectivity between upland and riparian habitat, wetlands, and floodplain areas.
2. Reduce sediment loads.
3. Improve water quality.
4. Restore native vegetation.
5. Restoration projects that have a high benefit to cost ratio.
6. Restoration projects that contain an educational component.
7. Restoration projects that allow public opportunity to observe and or participate in restoration activities.

Restoration Goals Objectives and Policies

Goal

The goal of restoration is to achieve a net gain in shoreline ecological functions by providing for the timely repair and rehabilitation of impaired shorelines through a combination of public and private programs and actions.

Objectives

- Restoration projects shall be designed with the intent to achieve no net loss of ecological functions.

- Encourage cooperation between public agencies, private property owners, citizens, and volunteer groups for restoration projects.

- Facilitate restoration by expediting and simplifying the shoreline permit process for projects that are conducted solely for restoration purposes.

- Encourage public education of shoreline function and ecology in conjunction with restoration projects.

Policies

- Restoration and enhancement of shorelines should be designed using principles of landscape and conservation ecology and should restore or enhance chemical, physical, and biological watershed processes that create and sustain shoreline habitat structures and functions.

- Mitigation associated with shoreline development projects shall be designed and to achieve no net loss of ecological function.

- The county shall seek funding from state, federal, private and other sources to implement restoration, enhancement, and acquisition projects.

- Develop review guidelines that will streamline the review of restoration only projects.

- Encourage public and private shoreline owners to promote the proliferation of native, noninvasive wildlife, fish and plants.

- Restoration projects shall be coordinated with local public utility and conservation districts.

- Ensure that long-term maintenance and monitoring of restoration sites is included in the original permitting of the project.

- Allow for the use of tax incentive programs, mitigation banking, restoration grants, land swaps, or other programs, as they are developed to encourage restoration of shoreline ecological functions and protect habitat for fish, wildlife and plants.

- Jurisdictions shall pursue the development of a public benefit rating system that provides incentives for the restoration of the shoreline.

- Jurisdictions shall coordinate with state resource agencies to develop educational materials which promote the maintenance and restoration of shoreline functions. Educational materials shall provide resources for a variety of scenarios and trends occurring within the shoreline that are reflected in the inventory and analysis, such as: the conversion of agricultural land to non-agricultural use, existing and ongoing agricultural uses, and existing or planned residential and commercial development.

- Encourage the agricultural industry to continue to work closely with agencies, such as the Natural Resource Conservation Service and Foster Creek Conservation

District, with expertise in agricultural practices and restoration to improve degraded shoreline functions.

Rock Island Lakes

Goal R1: Work toward removing non-native plants that have colonized the lakes.

Policy R1.1 – Coordinate with the Rock Island Lake Enhancement Committee and the Chelan County PUD to implement the Rock Island Weed Plan.

Policy R1.2 – Encourage and support joint volunteer and agency weed removal activities and programs, and develop guidelines for streamlined review of these activities.

B.6. Implementation and monitoring

In addition to project monitoring required for individual restoration and/or mitigation projects, the cities and the county should conduct system-wide monitoring of shoreline conditions and development activity, to the degree practical, recognizing that individual project monitoring does not provide an assessment of overall shoreline ecological health. The following three-prong approach is suggested:

1. Track information using GIS and the permitting systems as activities occur (development, restoration and mitigation), such as:

a. New shoreline development, by permit type
b. Unresolved compliance issues
c. Mitigation areas
d. Restoration areas

The county or city may require project proponents to monitor as part of project mitigation, which may be incorporated into this process. Regardless, as development and restoration activities occur in the shoreline area, the municipalities should seek to monitor shoreline conditions to determine whether both project specific and SMP overall goals are being achieved.

2. Periodically review and provide input to the regional ongoing monitoring programs/agencies, such as:

a. Washington Dept of Ecology water quality monitoring
b. Douglas County Watershed Planning Unit
c. Foster Creek Conservation District
d. Washington Department of Fish and Wildlife
e. The Nature Conservancy
f. Upper Columbia Salmon Recovery Board

g. The Public Utility Districts

Through this coordination with regional agencies, the municipalities should seek to identify any major environmental changes that might occur.

3. Re-review status of environmental processes and functions at the time of periodic SMP updates to, at a minimum, validate the effectiveness of the SMP. Re-review should consider what restoration activities actually occurred compared to stated goals, objectives and priorities, and whether restoration projects resulted in a net improvement of shoreline resources. Under the Shoreline Management Act, the SMP is required to result in no net loss of shoreline ecological functions. If this standard is found to not be met at the time of review, county or city will be required to take corrective actions. The goal for restoration is to achieve a net improvement. The cumulative effect of restoration over the time between reviews should be evaluated along with an assessment of impacts of development that is not fully mitigated to determine effectiveness at achieving a net improvement to shoreline ecological resources.

To conduct a valid reassessment of the shoreline conditions every seven years, it is necessary to monitor, record and maintain key environmental metrics to allow a comparison with baseline conditions.

As monitoring occurs, the county and cities should reassess environmental conditions and restoration objectives. Those ecological processes and functions that are found to be worsening may need to become elevated in priority to prevent loss of critical resources. Alternatively, successful restoration may reduce the importance of some restoration objectives in the future.

Evaluation of shoreline conditions, permit activity, GIS data, and policy and regulatory effectiveness should occur at varying levels of detail consistent with the Regional Shoreline Master Program update cycle. A complete reassessment of conditions, policies and regulations should be considered every seven years.

Appendix C. Cumulative effects

This section describes the cumulative impacts, or effects, of the changes in designations and projected land use over the next 10-20 years. Discussion includes the description of no net loss of shoreline ecological functions, current circumstances-describing the changes that have occurred and what would be expected with present designations, policies and regulations, future expected changes as a result of proposed designations, goals, policies and regulations, and the beneficial effects of those changes.

The inventory and characterization phases of SMP development are critical to understanding the shoreline resources of a particular jurisdiction. This also establishes the base from which compliance with the standard of "no net loss" is to be measured for purposes of reviewing and approving the SMP.

WAC 173-26-186 (8) (d)

> Local master programs shall evaluate and consider cumulative impacts of reasonably foreseeable future development on shoreline ecological functions and other shoreline functions fostered by the policy goals of the act. To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts among development opportunities.

The cumulative effects analysis considers the ecological functions of the shoreline that are affected by unregulated activities, development exempt from permitting, effects such as the incremental impact of residential bulkheads, residential piers, and runoff from newly developed properties. Accordingly, particular attention should be paid to policies and regulations that address platting or subdividing of property, laying of utilities, and mapping of streets that establish a pattern for future development that is to be regulated by the master program.

Cumulative impact analysis requires an understanding of the current use pattern and the impacts to shoreline ecological functions that have resulted from it, a reasonable estimation of future development potential and consideration of the beneficial effects of other applicable regulatory systems on future development. From this analysis, alternative scenarios for master program policies and regulations can be developed and the impact of those scenarios evaluated.

Impacts – The direct impacts, indirect impacts, and cumulative impacts of individual or multiple actions or events. Impacts are environmental, economic, social, and cultural in nature. Impacts may be beneficial, adverse, or perhaps both over different periods of time. For example, riparian restoration or enhancement will likely have direct adverse impacts over the short-term from the removal of existing ground cover of degraded sites and the loss of erosion control that typically non-native or invasive species provided. The project, however, will likely result in net beneficial impacts over the long-term due to

the new diverse native vegetation and the improved habitat and ecological functions that it will provide. Also, riparian restoration across the broader landscape over the long-term will likely have significant cumulative beneficial impacts.

Direct Impacts – The immediate impacts of an action or event. These include the immediate loss, change, or replacement of one type of environmental characteristic with another. Examples include the replacement of a shrub steppe environment with a residential development and its associated landscaping; the loss of benthic habitat with the placement of a pile; the diversion of surface and ground water due to grading and/or drainage systems; or the mortality of fish and benthic organisms from dredging.

Indirect Impacts – Interrelated and independent impacts caused by, or resulting from, an action or event. Examples include the increase, decrease, or shift in plants or animals utilizing the site, perhaps caused by changes in hydrology, microclimate, or habitat structure; decrease or increase in water quality or quantity; or the increase or decrease in mortality of plants or animals.

Cumulative Impacts – The combined impacts that accrue over time and space from a series of similar or related individual actions, including historic, present, and foreseeable future actions. Cumulative impacts are additive (linear) or interactive (nonlinear). Although each action may seem to have a negligible impact, the combined impacts could result in significant and perhaps widespread changes. Examples include the loss of habitat size, shape, or characteristic, including prey species, to sustain a particular species; alteration of the hydrologic characteristics of a drainage basin and the associated impacts to fish, wildlife, and plant species; or the starvation of a drift cell and its accretion shoreforms.

C.1 No net loss

WAC 173-26-201(2)(c) states:

> Master programs shall contain policies and regulations that assure, at minimum, no net loss of ecological functions necessary to sustain shoreline natural resources. To achieve this standard while accommodating appropriate and necessary shoreline uses and development, master programs should establish and apply:
>
> - Environment designations with appropriate use and development standards; and
> - Provisions to address the impacts of specific common shoreline uses, development activities and modification actions; and
> - Provisions for the protection of critical areas within the shoreline; and
> - Provisions for mitigation measures and methods to address unanticipated impacts.

One of the most important policies in the SMA is the protection of shoreline natural resources. SMP's must achieve a 'no net loss of ecological functions' necessary to sustain shoreline natural resources as development and use of the shoreline continues

over time. Influences outside of the shoreline jurisdiction place additional pressure on those same shoreline resources. (e.g. development of vacant lands, increase in impervious areas, loss of native vegetation, native soil disturbance).

The policy to achieve a 'no net loss of ecological functions' within shorelines highlights the uniqueness of local SMP's. Local SMP's are both a planning or, programmatic tool and a regulatory document. Ecological functions of our shorelines are a result of all the biological, physical and chemical processes within a watershed. Therefore local SMP's must address these processes by combining basin-wide restoration planning efforts with regulatory provisions all the way down the reach scale within one cohesive document. The proposed Regional Shoreline Master Program policies and regulations, and any required mitigation will assure a no net loss of ecological functions.

Critical areas discussion
Generally development proposals are reviewed by the guidance used for wetlands and riparian resources with regard to shorelines:

1. Avoiding the adverse impact altogether by not taking a certain action or parts of an action, or moving the action.
2. Minimizing adverse impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology and engineering, or by taking affirmative steps to avoid or reduce adverse impacts.
3. Rectifying the adverse impact by repairing, rehabilitating or restoring the affected environment.
4. Reducing or eliminating the adverse impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the adverse impact by replacing, enhancing, or providing similar substitute resources or environments.
6. Monitoring the impact and taking appropriate corrective measures.

C.2 Current circumstances affecting the shorelines and relevant natural processes

The current circumstances affecting shorelines were examined by comparing the changes in designations of the shorelines and the current uses and conditions based on the inventory and characterization (Appendix A). The current environment designations within jurisdictions in Douglas County were compared for expected changes that may occur based on the previous SMP designations and regulations and the proposed updated SMP.

The current uses on the shoreline were analyzed for the inventory and characterization of the shorelines. That analysis indicated that most shoreline development has or is occurring along the Columbia River shoreline between Rock Island Dam and just north of Beebe Bridge (McNeil Canyon). The majority of these areas have been, and are, conversions from irrigated orchard to varying densities of residential development. This section of the shoreline is currently designated in the Comprehensive Plans in higher densities that the remaining rural areas. Several smaller areas, where existing denser development occurs, most of the shoreline is developed to an extent that no expected

changes are likely to occur, with the exception of Orondo, a Rural Service Center. At the scale of the inventory no bulkheads were identified, but may occur at boat launches or older existing docks. Generally, bulkheads have been restricted by the public utility districts from shorelines within their project areas.

Within the City of East Wenatchee and urban growth area (UGA) very little development has occurred on the river. In fact, there is less than there was 100 years ago, when the river was used as a transportation corridor. Most of the shoreline is owned by the Washington State Department of Transportation, originally acquired for a riverfront highway, or by Chelan County Public Utilities District. Currently, a trail system and a wastewater treatment plant are the primary uses. Most zoning is residential, although some small areas are either mixed use or commercial.

The shorelines in the City of Bridgeport's UGA, similar to the City of East Wenatchee, does not have extensive development on the shorelines. Most of the jurisdictional shoreline is owned by the Douglas County Public Utility District or U.S. Army Corps of Engineers. The primary use occurring is recreational, Marina Park. Just above and below Chief Joseph Dam the Corps has armored the shoreline to prevent erosion from fluctuating water levels. There is also a boat launch above the dam. Private land adjacent to the PUD's property is zoned for varying levels of development, mostly residential. The PUD does have a landowner permit system that provides an opportunity for adjacent landowners to seek access to the shoreline, if within the PUD's management guidelines.

Rock Island's UGA along the Columbia River is a mix of industrial uses, at the south end, and undeveloped land. Much of the undeveloped area is basalt outcrop that would be difficult to develop or provide access to the river for upland development. The industrial activities are currently occurring inside the old silicon plant and related facilities. There is extensive shoreline alteration onsite. The lakes (6) around the Rock Island "Tea Cup" have a lot of community interest for recreational and economic development. Two of the lakes are currently under permit for gravel extraction, with the long-term intent of providing better habitat (depth) for fisheries and recreational opportunities. All of the other lakes provide recreational fisheries as well. The majority of property around the lakes is either owned by the City of Rock Island or the Chelan County Public Utilities District.

On the Waterville Plateau there is very little existing development on the interior lakes or Banks Lake due to ownership, proximity to existing developed areas, water availability and the water quality of most lakes being alkaline in nature. The vast majority of any land disturbances are agriculture related, grazing and dryland agriculture, and not from development.

The Columbia River is highly regulated by the hydro-electric system, such that natural processes are altered. In Douglas County some areas of the river are more riverine like and others lake like. For example, the shoreline vegetation and structure is similar to a lake system in many places- annual flooding regimes are minimal and have little to do

with the structural components of a floodplain, although some erosion occurs along the shoreline where steeper slopes exist. In many near shore areas aquatic plants have established typical of a lake system as well. Some of the biological components within the water have retained a riverine composition; the building blocks of the ecosystem, phyto- and zooplankton, are riverine species and in densities typical of a river.

The 1975 Douglas County Regional Shoreline Master Program does not include any Natural Environment Designations. In the revised SMP, the citizen advisory committee and jurisdictions have designated significant areas of Natural in areas that are either remote, extremely difficult to develop because of talus or steep slopes, or lakes that are alkaline in nature.

C.3 Foreseeable future development and use of the shoreline

There is very minimal development likely to occur on the interior lakes or Banks Lake due to ownership (public or large landowners), proximity to existing development, and the water quality on most being alkaline in nature. Jameson Lake may have some recreational or rural residential related development occur on the north end- likely converting agricultural uses to others. On the south end of Jameson Lake very little development is expected to occur as most of the shoreline available for development has already occurred and the existing road lines the banks. The County records indicate almost no permits for development along any of the lakes in the last 10 years; only a couple in the Jameson Lake area.

The Columbia River

Because the future development is likely to be very different in each of the reservoirs, this discussion will be separated into those areas, with the urban areas discussed separately at the end.

Lake Rufus Woods

Most of this section of the river is designated Natural for a combination of factors: lack of development presently, poor accessibility, likelihood of demand for development in the future, extent of geologic hazards (steep or talus slopes), U.S. Corps of Engineers easement restrictions and ownership. Rural Conservancy was designated in areas where development may occur; agricultural areas and access points that presently exist. In the next 10-20 years the Corps is the most likely entity to improve or create shoreline access improvements, or other similar activities and is exempt from local permitting. Private development is most likely to occur in the section immediately upstream from Chief Joseph Dam where the zoning is Commercial Agriculture-10. The remaining shoreline is zoned either Dryland Ag-20 or Rural Resource 20. The proposed policies and regulations for the two Environment Designations should provide adequate protection or mitigation of shoreline resources. Any development that is likely to occur would be a conversion of uses- irrigated or row crop agriculture to residential and/or with water dependant uses (docks, etc.).

Lake Pateros

The Douglas County Public Utility District owns virtually all of the shoreline, although not the entire 200 foot jurisdictional area in all places. Similar to the Corps of Engineers, the PUD has a landowner agreement that allows some limited activities to occur on the shoreline (once all other permits are approved). The PUD also manages some of the area for fish and wildlife. In addition, some of the upland shoreline is also owned by state agencies or the Colville Tribes that are designated for fish and wildlife uses. The shoreline from Crane Orchards to the City of Bridgeport is a mix of Natural and Rural Conservancy Environment Designations; specific areas that are planned for wildlife management or inaccessible being designated Natural. The area upstream from Wells Dam to Crane Orchards is largely inaccessible and has some steep and unstable slopes thereby preventing most development from occurring, and designated Natural. Within the City of Bridgeport Urban Growth Area there is a mix of urban environment designations that generally follow the Comprehensive Plan designations. The likelihood of any significant development occurring along the shorelines in the next 10-20 years is minimal; development is most likely to occur in the Bridgeport UGA.

The City of Bridgeport expects some development to occur along the Columbia River shorelines, although to date interest has been limited. The ownership by the Douglas County PUD and U.S. Army Corps of Engineers in large part controls the level of development. There is interest in some shoreline related commercial uses and possible access by adjacent landowners although since it is a small community, much of the access desired is provided by the facilities at Marina Park. The shoreline has been designated Urban Conservancy on public lands east of the SR 17 bridge, and either Shoreline Residential or Mixed Use west of the bridge. Because of the current conditions and mitigation required for proposals no net impact is expected.

Lake Entiat

Part of this section of river, from just north of McNeil Canyon south to Rocky Reach Dam, is likely to have the most development of all the Columbia River within Douglas County based on recent subdivisions of land, development, and zoning, including clustering provisions. This section is primarily designated Rural Conservancy, with small areas designated Natural and where local areas of more intense rural development, designated Shoreline Residential or Urban Conservancy. The Orondo Rural Service Center is the exception, designated Mixed Use to provide consistency with the Douglas County Comprehensive Plan. Upstream from McNeil Canyon to Wells Dam the shoreline is inaccessible and has very steep slopes that would prevent development from occurring in the next 10-20 years, and has been designated Natural. Chelan County PUD has flood easements along the entire reservoir, and in some areas owns the shorelines.

Rock Island Reservoir

This section of river is likely to have the second most development of all the Columbia River in Douglas County based on proximity to East Wenatchee, recent subdivisions of land, development, and zoning, including clustering provisions. The primary area where development may occur is south of the SR 28 bridge (George Sellar Bridge), designated a mix of Shoreline Residential, High Intensity, and Urban Conservancy. North of the

George Sellar Bridge the shoreline is almost entirely owned by the Washington State Department of Transportation, which has been designated Urban Conservancy; one existing use, the Douglas County Sewer District facilities occurs in just north of the Bridge. This reservoir includes the cities of East Wenatchee and Rock Island, discussed below. Chelan County PUD has flood easements along the entire reservoir, and in some areas owns the shorelines.

Within the City of East Wenatchee UGA the development along the Columbia River most likely to occur is recreational in nature; additional trails and possible development of an additional boat access point. The upper banks, likely outside of the 200 foot jurisdictional area, will have increased residential development and some commercial development. The potential effect of development is increased use of the trail system, reduction in irrigated agricultural uses and stormwater runoff. Since the area is within a stormwater utility and regulated as such, stormwater runoff should have a very minor to negligible effect on the shorelines. Most of the shoreline has been designated Urban Conservancy because of the trail system and ownership, thereby providing adequate protection and regulation of shoreline uses. Because of the current conditions and mitigation required for proposals no net impact is expected.

The City of Rock Island shorelines, as previously discussed has inherent limitations to future development to most of the Columbia River. As provided for in the Restoration Plan, the developed industrial area has been identified as having potential for restoration. Over time it is likely that a net gain in shoreline functions could be realized through planning and development proposal mitigation. For the six lakes, various activities that are planned and in discussion in the community should improve the overall shoreline and aquatic functions. Gravel extraction operations, over the long-term, should improve the functions of Putter's and Marina lakes by providing a wide variety of lake and shore habitats. The golf course, should it expand, would be required to mitigate for any changes in the shorelines along Putter's and Hammond Lakes. Pit Lake, a juvenile fishing pond, may have additional recreational facilities incorporated, although they would not negatively affect the shorelines, and may improve conditions by concentrating some activities to specific sites. Hideaway Lake has been almost completely been designated natural; the Chelan County PUD owns almost all of the shoreline and annual recreational activities are expected to remain the same. Big Bow Lake, heavily used for recreational fisheries, may have some improvements in the established access sites, and may have some development occur that would replace existing orchards. Because of the current conditions and mitigation required for proposals no net impact is expected.

Wanapum Reservoir

This section is likely to have the third most development of all the Columbia River in Douglas County based on available land and zoning, including clustering provisions. Portions of the area are inaccessible, having very steep slopes and basalt outcrops that would prevent development from occurring. Grant County PUD has flood easements along the entire reservoir, and in many areas owns the shorelines.

C.4 Analysis of future development

Future development was examined developing two linear regression models. The first model was developed using the County Assessor records for sales of property located on the shorelines. The second model was based on building permits issued by the Transportation and Land Services Department for parcels within, or partially within, the shoreline jurisdiction. These two approaches were used to reflect what has occurred in recent years. A third analysis was completed on the shoreline based on all vacant parcels and parcels over 10 acres that are built, but have buildable area to approximate a future development scenario. Included in the analysis is the affect of clustering provisions. The result is what could happen at approximately full build-out- number of lots and dwelling units, and assuming different scenarios of lots sharing boating facility; a dock or similar mooring facility. The criteria developed to conduct the analysis include:

1. Zones that allow clustering were separated from those that do not; urban and agriculture designations;
2. No publicly owned land were included;
3. Vacant lots too small to be divided were added to dwelling units and boating facilities;
4. Boating facilities were estimated at 1, 2 and 4 lots per facility;
5. No critical areas were considered where a structure may not be able to be built;
6. Parcels include those in the land use inventory- residential over 1 acre, agriculture, and vacant;
7. Urban areas were calculated at ½ acre land divisions
8. Areas where community facilities were created, Bauer's Landing and Sun Cove, were not included in the boating facility calculation;
9. Other regulatory restrictions, such as Regional General Permits were not considered;
10. Lots configured in such a manner that shoreline division could NOT occur were not considered- likely a very small amount.

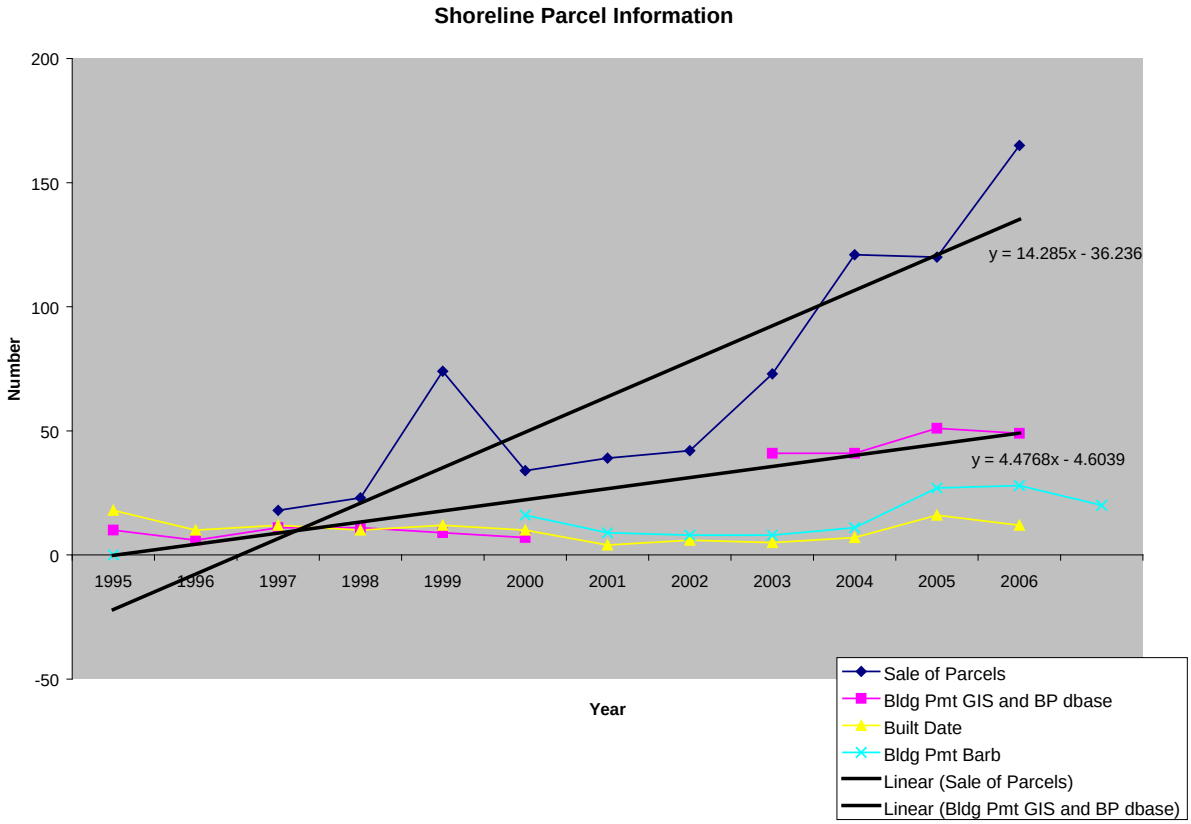
This third analysis also reflects full build-out and not representative of actual expectations based on past trends for the next 20 years as the linear regression models do.

Linear regression models

The linear regression models used actual data were depicted using the following calculations:

Sales (Y) = 14.285X – 36.236 and
Building Permits (Y) = 4.4768X – 4.6039

The chart below shows the actual data and the linear regression trend lines developed from that data.



Because records were difficult to match parcel numbers in the geographic information system (GIS) data, several sources were examined; Excel tables prior to initial use of tracking software, changes in the land use inventory (GIS parcel layer changes), and the newer permit tracking software. Building date data from the Douglas County Assessor's Office was also analyzed, but based on permit and sales data, was deemed to be too inaccurate (permits for things other than initial structure construction could not be easily separated/ascertained). Table 1 below depicts the final linear regression analysis and corresponding numbers in sales and building permits.

Table 1. Regression analysis of expected homes and lots.

Year	***Sales***	***Building Permits***
2004	103	41
2005	120	45
2006	134	50
2007	149	54
2008	163	59
2009	177	63
2010	191	68
2011	206	72
2012	220	77

2013	234	81
2014	249	86
2015	263	90
2016	277	95
2017	291	99
2018	306	104
2019	320	108
2020	334	113
2021	349	117
2022	363	122
2023	377	126
2024	391	131
2025	406	135
2026	420	139
2027	434	144
2028	449	148

This analysis does not necessarily indicate two things regarding sales: resales of property, and whether they are vacant or not at the date of sale. For the both analyses, it reflects only a linear affect; i.e. as property is divided, it is unclear if the overall development is linear or curvilinear (increasing at a rate that depicts something closer to an exponential type curve. Either way, building can be expected to be somewhere between the two datasets over the next twenty years, given the prior years trend.

Parcel vacancy analysis

The table below reflects the cluster and development analysis at full build-out, given assumptions listed above. Deeded (Assessor's Office) and calculated (GIS) acres were used as there are discrepancies in each from drawing, measuring, or deed errors may have occurred. Therefore it can be expected that some number in between the two is close.

Table 2. Parcel development analysis.

Parcels in the analysis only include residential over 1 acre, agriculture and vacant. No public lands are included.						
The category "Cluster Zones" only includes those areas where bonus density can occur.					Urban was calculated at 1/2 acre divisions	
Does not consider critical areas limitations, or if the lot configuration is such that some of the lots could not occur in the 200' area.						
	RR-2.5 to 20		Urban and ag			
DEEDED ACRES	Cluster Zones		Non-cluster Zones			
Location	Existing Lots	Potential Lots	Existing Lots	Potential Lots	Total Potential Lots*	Dwelling Units**
Lake Entiat North	7	57	-	-	57	57
Lake Entiat						

South	219	1,317	76	725	2,042	2,069
Lake Pateros	41	180	40	150	330	333
RI Lakes	30	150	10	263	413	402
Rock Island	36	75	11	172	247	232
Rufus Woods	48	438	15	97	535	535
Wanapum	3	14	17	189	203	202
TOTAL	384	2,231	169	1,596	3,827	3,830
* includes lots with an existing dwelling unit						
** removed existing dwelling units to adjust total- only potentially new units included						
Dwelling units can be higher than potential lots. Those lots not divisible, but that are vacant or currently in agricultural use, get a value of 1						
CALCULATED ACRES	Cluster Zones		Non-cluster Zones			
Location	Existing Lots	Potential Lots	Existing Lots	Potential Lots	Total Potential Lots*	Dwelling Units**
Lake Entiat North	7	57	-	-	57	57
Lake Entiat South	80	1,153	2	714	1,867	1,895
Lake Pateros	42	161	40	142	303	306
RI Lakes	32	150	9	252	402	390
Rock Island	39	79	11	166	245	228
Rufus Woods	48	454	16	99	553	556
Wanapum	3	14	17	194	208	207
TOTAL	251	2,068	95	1,567	3,635	3,639
Potential water structures- docks, lifts. Varying number per group of lots is given, lots not available were accounted for.						
i.e. Bauer's and Lake Entiat Estates excluded since they have community docks.						
DEEDED ACRES						
Location	Docks @1 per lot	1 per 2 lots	1 per 4 lots*			
Lake Entiat North	57	29	17			
Lake Entiat South	2122	1231	780			

Lake Pateros	417	273	196			
RI Lakes	436	242	144			
Rock Island	260	159	102			
Rufus Woods	555	308	171			
Wanapum	118	72	46			
TOTAL	3,965	2,314	1,456			
*Individual Lots are calculated as one available per one lot- the rest are rounded up- i.e. if there are 2 lots possible, one dock.						
All lots within 50 feet of an inventoried dock or ramp were excluded. All public lands excluded.						
CALCULATED ACRES						
Location	Docks @1 per lot	1 per 2 lots	1 per 4 lots*			
Lake Entiat North	57	29	17			
Lake Entiat South	1916	1129	727			
Lake Pateros	391	261	190			
RI Lakes	423	238	139			
Rock Island	254	154	101			
Rufus Woods	575	312	178			
Wanapum	118	70	47			
TOTAL	3,734	2,193	1,399			

While doing a build out analysis can help with depicting trends, many assumptions go into the analysis that would reduce the numbers considerably. Changes in clustering provisions, including not allowing clustering in the Natural Environment Designation, lot widths, requirements in new plats for joint or community use facilities, critical areas standards, bulk, dimensional and density standards, impervious surface limitations, infrastructure limitations, and underlying zoning would significantly reduce the calculations, although an exact number cannot be arrived at with great confidence. Generally what can be characterized are where most development is likely to occur and the increasing demands to uses, including recreation, within shorelines. The trend analysis supports the adoption of the plan, goals, objectives and regulations which seek to guide where and how development and shoreline activities may most appropriately be developed consistent with the intent and requirements of the Shoreline Management Act and the shoreline visioning report. The goals, objectives, policies and regulations were designed to achieve a no net loss to ecosystem values and functions, while recognizing projected demand of development expected to occur. It can also assist in long range planning of public facilities for recreation (where demand is likely to occur most) and measures to prevent conflicts with preferred uses of the shoreline in the future.

Development discussion- mitigation and avoidance of cumulative impacts
While the models above give a sense of development expected to occur in the future, several policies and regulations will limit the development on the shoreline and over/in water. Within Douglas County and the cities the predominant development expected to

occur along shorelines is residential development and associated water dependent facilities, such as docks, boat lifts and mooring buoys. Very little commercial or industrial activities are expected within the next 20 years. Within the shoreline areas. The regulations provide direction for residential or other development, docks, and other related facilities, that may occur, and provides for mitigation where impacts may occur to acheive a no net loss of ecosystem functions and values balanced with protection of private property rights. Below is a discussion on Chapter 3 and the specific policies and regulations that apply to docks from Sections 4 and 5 as an example of the framework for that particular shoreline use. This example is given based on the analysis on docks provided previously in this Appendix. Following the dock discussion is a brief discussion on residential development and the regulatory framework in Chapters 3, 4 and 5.

Chapter 3 discusses all of the Environment Designations and specifically the table in Section 3.10 Use Matrix lists most activities that may be permitted in each of the designations. The Table specifically allows or restricts certain types of development that may be analyzed generally by allowed or permitted uses by Environment Designation. Development is generally more intense to less intense in the following order: High Intensity, Mixed Use, Shoreline Residential, Urban Conservancy, Rural Conservancy and Natural. This general scheme translates into the regulations in Chapters 4, 5, particularly in Section 5.13 Shoreline Bulk and Dimensional Standards, and Appendix H.

Dock facilities
Policy from Section 4.1- General
1. Shoreline use and development should occur in a manner that assures no net loss of existing ecological functions and processes and protects critical areas. Uses should be designed and conducted to avoid, minimize, or to fully mitigate in so far as practical, any damage to the ecology and environment.

Regulations from 4.1
1. Mitigation Sequencing – applicants shall demonstrate all reasonable efforts have been taken to mitigate potential adverse impacts in the following prioritized order:

a. Avoiding the impact altogether by not taking a certain action or parts of an action;
b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;
c. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment to the conditions existing at the time of the initiation of the project;
d. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
e. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and
f. Monitoring the impact and the compensation projects and taking appropriate corrective measures.

Policies from Section 4.2
1. The location, construction, operation, and maintenance of all shoreline uses and developments should maintain or enhance the quantity and quality of surface and ground water over the long-term.

Regulations from Section 4.2
3. Best management practices (BMP's) for control of erosion and sedimentation shall be implemented for all development in shorelines through an approved temporary erosion and sediment control plan, identified in the Stormwater Management Manual for Eastern Washington, as amended.

5. All building materials that may come in contact with water shall be constructed of untreated wood, cured concrete or steel. Materials used for decking or other structural components shall be approved by applicable state agencies for contact with water to avoid discharge of pollutants. Wood treated with creosote, arsenate compounds, copper chromium arsenic or pentachlorophenol is prohibited in shoreline water bodies.

Policies from Section 4.3
1. Native shoreline vegetation should be conserved to maintain shoreline ecological functions and/or processes and mitigate the direct, indirect and/or cumulative impacts of shoreline development, wherever feasible. Disturbance of native plant communities should be avoided. Disturbed areas should be revegetated with native plant species appropriate to the soil and hydrologic conditions.

2. Encourage noxious and invasive weed management and control. Control of such species should be done in a manner that retains onsite native vegetation, provides for erosion control, and protects water quality.

Regulations from Section 4.3
2. Where impacts to buffers are permitted under Section 4.1, Environmental Protection and Critical Areas, new developments shall be required to develop and implement a management and mitigation plan. When required, management and mitigation plans shall be prepared by a qualified biologist and shall be consistent with the requirements in Appendix H. Management and mitigation plans shall describe actions that will ensure no net loss of ecological functions. Vegetation shall be maintained over the life of the use and/or development by means of a conservation easement or similar legal instrument recorded with the County Auditor.

4. Native vegetation clearing shall be limited to the minimum necessary to accommodate approved shoreline development.

5. Removal of noxious weeds and/or invasive species shall be incorporated in management and mitigation plans, as necessary, to facilitate establishment of a stable community of native plants.

Policy from Section 4.6- Public Access
1. Access to shorelines should be incorporated in new development and may be physical and/or visual to provide the public with the opportunity to enjoy the water's edge, and view the water and shoreline.

3. Community access should be required for residential development.

Regulations from 4.6
1. Where required, provisions for adequate public or community access to the shoreline shall be incorporated into a shoreline development proposal, including land division, unless the applicant demonstrates that one or more of the following provisions apply:

a. Unavoidable health or safety hazards to the public exist which cannot be prevented by any practicable means;
b. Inherent security requirements of the use cannot be satisfied through the application of alternative design features or other solutions;
c. Unacceptable environmental harm will result from the public access which cannot be mitigated;
d. Significant undue and unavoidable conflict between the proposed access and adjacent uses would occur and cannot be mitigated;
e. The cost of providing the access or alternative amenity is unreasonably disproportionate to the long-term cost of the proposed development.
f. Provided further, that the applicant has first demonstrated and the county or city has determined in its findings that all reasonable alternatives have been exhausted, including but not limited to:
    (1) Regulating access by such means as limiting hours of use to daylight hours;
    (2) Designing separation of uses and activities, i.e., fences, terracing, hedges, landscaping, signage, etc;
    (3) Provision of an access at a site physically separated from the proposal such as a nearby street end, an off-site view point or trail system.

5. All residential development shall have access to the shoreline. Multi-unit residential development and land divisions shall provide community access to the shoreline.

8. Development uses and activities shall be designed and operated to avoid blocking, reducing, or adversely interfering with the public's physical access to the water and shorelines.

Policies from Section 5.10
1. Where other community or public moorage facilities are available, individual moorage associated with a single family residence will be discouraged.

2. New moorage, excluding docks (private, joint-use, and community) accessory to single family residences, should be permitted only when the applicant/proponent has demonstrated that a specific need exists to support intended water-dependent or public access use.

3. As an alternative to continued proliferation of individual private moorage, mooring buoys are preferred over docks or floats. Moorage facilities for new residential development of two or more lots or two or more dwelling units should provide shared moorage facilities.

5. Moorage should be restricted to the minimum size necessary to meet the needs of the proposed water-dependent use. The length, width and height of piers and docks should be no greater than necessary for safety and functional use.

7. Moorage facilities should not be constructed of materials that will adversely affect water quality or aquatic plants and animals.

8. New moorage facilities should be designed so as not to interfere with lawful public access to or use of shorelines.

9. Multiple agencies have permitting standards, requirements or limitations for the use and development of moorage facilities. Many of these agencies have specific ownership or easement rights. The county and cities should coordinate with federal, tribal, state and local agencies during the review of shoreline permits. The granting of a shoreline permit does not relieve a project from compliance with the standards of other agencies.

Regulations from 5.10
1. Shared moorage to serve new residential development shall be limited to the amount of moorage needed to serve lots within the development.

2. Residential moorage for individual lots is permitted in subdivisions legally established prior to February 20, 1975, where shared moorage has not already been developed or required; private moorage is also permitted for individual legal lots of record, not part of an approved subdivision. In these circumstances, moorage shall be limited to one private dock per shoreline residential lot. Lot owners shall be encouraged to utilize mooring buoys or to coordinate with adjoining property owners for shared moorage.

3. If moorage is to be provided as part of a new residential development of two or more dwelling units, moorage facilities shall be joint use or community docks. New residential developments shall contain a restriction on the face of the plat and restrictive covenants prohibiting individual docks and requiring joint use or community dock facilities. Community dock facilities should be encouraged. A site for shared moorage should be owned in undivided interest by property owners or managed by the homeowner's association as a common easement within the residential development. Community dock facilities should be available to property owners in the residential development for community access. If shared moorage is provided, the applicant/proponent shall file at the time of building permit submittal for the dock a legally enforceable joint use agreement or other legal instrument that, at minimum, addresses the following:

a. Provisions for maintenance and operation;

b. Easements or tracts for community access; and
c. Provisions for joint or community use for all benefiting parties.

4. Commercial docks shall be permitted only for water-dependent uses, and if the applicant/proponent demonstrates that existing facilities in the vicinity, including marinas and shared moorage, are not adequate or feasible for the proposed water-dependent use.

5. Private moorage for float planes may be permitted accessory to existing or concurrently proposed moorage where construction would not adversely affect shoreline functions or processes, including wildlife use. Ecological restoration may be required to compensate for the greater intensity of activity associated with the use. An analysis of potential life and navigation safety impacts shall be required in addition to the inclusion of necessary avoidance or mitigation measures by a qualified professional.

6. New and substantially expanded piers and docks shall be constructed of materials that are approved by applicable federal and state agencies for use in water to avoid adverse effects on water quality or aquatic plants and animals in the long-term for both submerged portions of the dock and decking and other components. Wood treated with creosote, pentachlorophenol or other similarly toxic materials is prohibited.

7. Moorage facilities shall be the minimum size necessary to meet the needs of the proposed water-dependent use and shall observe the following criteria:

a. If allowed, only one private dock with one accessory float, and two watercraft lifts (the combination of one boat and one jet ski or other watercraft together) shall be permitted on a shoreline lot owned for residential or private recreational use.
b. Docks with or without a float shall be the minimum required to provide for moorage. Commercial docks shall be the minimum length necessary to serve the type of vessel served. Exceptions to these length standards are addressed below.
c. Docks on the Columbia River that exceed 100 feet in length or docks which exceed 50 feet in length on a lake or sites with unique site characteristics that may create navigational safety hazards shall prepare a navigational safety study.
d. Moorage shall be designed to avoid the need for maintenance dredging. The moorage of a boat larger than provided for in the original moorage design shall not be grounds for approval of dredging.

9. In order to minimize impacts on near shore areas and avoid reduction in ambient light level:

a. The width of piers, ramps, and floats shall be the minimum necessary and shall not exceed 4 feet in width, except where specific information on use patterns such as community docks may justify a greater width. Materials that will allow light to pass through the deck may be required where width exceeds 4 feet.
b. Dock surfaces designed to allow light penetration shall be used on walkways or gangplanks in nearshore areas.

11. Piers and docks shall use pile supports unless engineering studies demonstrate that pile supports are insufficient to ensure public safety. Rip-rapped or bulkheaded fills may be approved only as a conditional use and only when demonstrated that no feasible alternative is available. Mitigation shall be provided to ensure no net loss of shoreline ecological functions and processes.

12. Mooring buoys shall be placed at a distance specified by state and federal agencies to avoid near shore habitat and to minimize obstruction to navigation. Anchors and other design features shall meet Washington Department of Fish and Wildlife and/or Department of Natural Resources standards.

13. Commercial covered moorage may be permitted only where vessel construction or repair work is to be the primary activity and covered work areas are demonstrated to be necessary over water, including demonstration that adequate upland sites are not feasible. All other covered moorage is prohibited.

16. Moorage facilities shall be constructed and maintained so that no part of a facility creates hazardous conditions nor damages other shore property or natural features during predictable flood conditions. Floats shall be securely anchored.

18. Storage of fuel, oils, and other toxic materials is prohibited on docks and piers except portable containers when provided with secondary containment.

22. In the Natural Environment Designation moorage facilities must be compatible with the area's physical and visual character may be conditionally permitted subject to policies and regulations of this Program.

23. Moorage facilities shall avoid locations that will adversely impact shoreline ecological functions or processes.

24. Applicants for moorage facilities shall provide habitat surveys, critical area studies, and mitigation plans as required by Section 4.1, Ecological Protection and Critical Areas. A slope bathymetry map may be required when deemed beneficial by the Administrator for the review of the project proposal.

Given these constraints, Table 2 above demonstrates the differences in the number of facilities that may occur in the future at 2 to 4 lots per facility. Most of this activity is likely to occur on lands with agricultural uses that are converted to residential uses. Restoration and mitigation during the permitting or land division processes will provide a net benefit (increase) in ecological function as agricultural uses currently on-going typically control the width and size of the vegetation along the shorelines. Only a narrow band of riparian or wetland vegetation exists in these areas and area upland of there typically has a species composition of non-native and/or agricultural vegetation.. These areas are typically designated as Rural Conservancy in the County. Because of the current conditions and requirements for restoration and mitigation for development within the shoreline jurisdicional area, a no net loss, and in many cases an

improvement, of ecological functions will be acheived. In areas designated Natural, increased review will occur through a conditional use permit to ensure a no net loss of ecological function; commercial types of activities are not allowed within the Natural designation. In addition, clustering of lots is not allowed in the Natural designation, which would also further limit the number of docks and residential development, and devlopment density limited in Section 5.13 and by use of buffers and setbacks. Within the cities, most of the shoreline is publicly owned and not likely to develop in the same manner as the County. While this is not typical across the state, within Douglas County the urban shorelines are overall less developed than the Rural Conservancy designated areas due to the ownership pattern. Even so, the same policies and regulations apply with the exception of shoreline critical area standards in Appendix H.

Development Policies and Regulatory Framework (Residential, Commercial and Industrial)
In Chapter 3 the Environment Designation criteria is developed, and with the exception of the Mixed Use designation follows the state Shoreline Management Act guidelines. In the mapping of these designations the Inventory and Characterization was relied upon heavily, along with three guidelines: existing conditions, biological and physical chracteristics and local comprehensive plan and zoning designations and regulations. Using all the information and criteria, maps were developed. The following table lists the acres and percent of area designated within Douglas County and the cities.

Designation	Acres	Percent	Historic Acres	Percent
Natural	3398.7	54.6	0	0
Rural Conservancy	2043.7	32.8	5495.0***	93.5
Urban Conservancy	200.8	3.2	0	0
Shoreline Residential	221.2	3.6	0	0
Mixed Use**	38.6	0.6	0	0
High Intensity	134.89	2.2	382.8	6.5
Aquatic**	176.8	2.8	0	0
Total	6228.3			

*the area within the Coulee Dam city limits is not included
**not in use in 1975, the remaining match relatively close to the 1975 designations.
***includes a conservancy and a rural designation.
****equates to the existing urban designation.

Even though there are some changes in the areas covered and the types of designations and criteria, it is clear that the current proposed RSMP will reduce the potential impacts from the current program that was adopted in 1975. The current residential buffer in the SMP is 25 feet, whereas the proposed buffers range from 50 to 150 feet for allowed and permitted activities and an additional setback for structures that ranges from 10-15 feet. The current proposal also addresses and has more restrictions on some types of activities that the 1975 document did not address, such as boat lifts.

In the policy and regulatory sections, any activity that has the potential for impacts is addressed in section 4, 4 and Appendix H. Some of the most relevant policies and regulations include:

Policy from Section 4.1
1. Shoreline use and development should occur in a manner that assures no net loss of existing ecological functions and processes and protects critical areas. Uses should be designed and conducted to avoid, minimize, or to fully mitigate in so far as practical, any damage to the ecology and environment.

3. Development standards for density, lot frontage, setbacks, lot coverage, shoreline stabilization, vegetation conservation, buffers, critical areas, and water quality should protect existing shoreline ecological functions and processes. Review of shoreline development should consider potential impacts associated with proposed shoreline development when assessing compliance with this policy.

Regulations- Section 4.1
1. Mitigation Sequencing – applicants shall demonstrate all reasonable efforts have been taken to mitigate potential adverse impacts in the following prioritized order:

a. Avoiding the impact altogether by not taking a certain action or parts of an action;
b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;
c. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment to the conditions existing at the time of the initiation of the project;
d. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
e. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and
f. Monitoring the impact and the compensation projects and taking appropriate corrective measures.

2. The provisions of this section and appendix H shall apply to any use, alteration or development within shoreline jurisdiction, whether or not a shoreline permit or written statement of exemption is required.

3. Unless otherwise stated, critical area buffers shall be protected and/or enhanced pursuant to appendix H and all other applicable provisions of this Program.

5. The cumulative affects of individual development proposals shall be identified and evaluated to assure that no net loss standards are achieved.

With respect to shoreline alteration related to bank hardening, bulkheads and similar structures, there are strong policies and regulations to prevent development of such

structures unless absolutely necessary. These have been added below from Section 5.14 Shoreline Stabilization. Because of the local conditions identified in the inventory and characterization and these policies and regulations, there is little expectation of permitting stabilization structures related to a development proposal. It is expected that there may be some very limited areas where public health, welfare and safety may be a concern and will be addressed in the permitting process to minimize the need for such structures.

Policies- Section 5.14
1. Alternatives to structures for shoreline protection should be used whenever possible. Such alternatives may include no action, increased building setbacks, building relocation, drainage controls, and bioengineering, including vegetative stabilization, and beach nourishment.

2. New or expanded structural shoreline stabilization for new primary structures should be avoided. Instead, structures should be located and designed to avoid the need for future shoreline stabilization where feasible. Land divisions should be designed to assure that future development of the created lots will not require structural shoreline stabilization for reasonable development to occur.

3. New or expanded structural shoreline stabilization should only be permitted where demonstrated to be necessary to protect an existing primary structure that is in imminent danger of loss or substantial damage, and where mitigation of impacts would not cause a net loss of shoreline ecological functions and processes.

Regulations- Section 5.14
1. New development or land divisions with a known or suspected geological hazard shall be set back from the geologic hazard or designed sufficiently to ensure that shoreline stabilization is not required during the life of the project, as demonstrated by a geotechnical analysis prepared in conformance with Section 4.1 Ecological Protection and Critical Areas.

2. New, expanded or replacement shoreline stabilization shall not be permitted unless it can be demonstrated that the proposed measures will not result in a net loss of shoreline ecological functions.

3. New or enlarged structural shoreline stabilization measures for an existing primary structure, including residences, is prohibited unless there is conclusive evidence, documented by a geotechnical analysis, that the structure is in danger from shoreline erosion caused by stream processes or waves. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not demonstration of need. The geotechnical analysis shall evaluate on-site drainage issues and address drainage problems away from the shoreline edge before considering structural shoreline stabilization.

4. New shoreline stabilization for new water-dependent development is prohibited unless it can be demonstrated that:
a. The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage; and
b. Nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient; and
c. The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report.

5. New shoreline stabilization for new non-water-dependent development, including single family residences, is prohibited unless it can be demonstrated that:
a. The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage; and
b. Nonstructural measures, such as placing the development further from the shoreline, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient; and
c. The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report. The damage must be caused by natural processes, such as stream processes or waves.

6. Where shoreline stabilization is allowed, it shall consist of “soft”, flexible, and/or natural materials or other bioengineered approaches unless a geotechnical analysis demonstrates that such measures are infeasible.

7. Replacement of an existing shoreline stabilization structure with a similar structure is permitted if there is a demonstrated need to protect primary uses or structures or public facilities including roads and bridges, railways, and utility systems, from erosion caused by stream undercutting or wave action. A geotechnical analysis shall be required to document that alternative solutions are not feasible or do not provide sufficient protection. Existing shoreline stabilization structures that are being replaced shall be removed from the shoreline unless removal of such structures will cause significant damage to shoreline ecological functions or processes. Replacement walls, bulkheads or revetments shall not encroach waterward of the ordinary high water mark or the existing shore defense structure unless the primary use being protected is a residence that was occupied prior to January 1, 1992, and there is overriding safety or environmental concerns. In such cases, the replacement structure shall abut the existing shoreline stabilization structure.

Commecial and industrial development that may be permitted, but are generaly restricted more than residential development. The commercial development is restricted to High Intensicy and Mixed Use environment designations. Very lmited areas of commercial actvity currently exists within the jurisdiction of the Shoreline Master Program. Most is in the form of a golf course in Rock Island, on lakes previously not included in the RSMP. These lakes were created in the mid 1970s after the last pool raise behind Rock Island Dam, but prior to the current SMP. Other areas have commercial development, but are located 200 or more feet from the OHWM. There is

some limited interest in the City of Bridgeport, but no proposals have been prosessed to date.

While the industrial uses are restricted to those areas designated High Intensity, and then only if hte underlying zoning includes industrial uses. At the date of the proposal, 2008, there is only one area that fits this description,which is in Rock Island along the Columbia River. The main reasons for this area being designated industrial is existing industrial uses and this area is the only place served by rail service. While neither the county or city has received any proposals within the jurisdictional area in the last 20-30 years, outside of public utility facilities, there may be a desire in the future. Some recent comprehensive reviews in the city indicates that there may be some changes in some of the currently designated industrial area to commercial or mixed use development in the future.

Because of the policies and regulatory framework in the RSMP, particularly as it relates to restoration and mitigation measures, it is anticpated that any impacts from development to the shorelines will not cumulatively impact the shoreline itself due to development, although changes in use are expected, such as changes from agricultural uses to dispersed residential. While this is a change in the overall characteristic of the shorelines or neaby uplands, the changes are not seen as negatively impacting the shorelines themselves, by avoiding or mitigating cumulative impacts from permitted uses with adequate buffers, setbacks and mitigation measures, environment designations, and finally the following regulation in Section 4.1:

2. The provisions of this section and appendix H shall apply to any use, alteration or development within shoreline jurisdiction, whether or not a shoreline permit or written statement of exemption is required.

C.5 Beneficial effects of any established regulatory programs under other local, state, and federal laws

The most common permits and/or review issues required for many shoreline/water-related projects include:

1. Review for compliance with the State Environmental Policy Act (SEPA), usually completed by the local jurisdiction. This process is completed as a part of the shoreline permitting process. The purposes of the State Environmental Policy Act Chapter 43.21C RCW are: (1) To declare a state policy which will encourage productive and enjoyable harmony between man and his environment; (2) to promote efforts which will prevent or eliminate damage to the environment and biosphere; (3) and stimulate the health and welfare of man; and (4) to enrich the understanding of the ecological systems and natural resources important to the state and nation.

2. Review for compliance with “Critical Areas Regulations” required by the Growth Management Act (GMA), completed by the local jurisdiction. With the adoption of this Shoreline Plan, the critical areas ordinances are incorporated.

Many permits are coordinated under a Joint Aquatic Resources Permit Application (JARPA) form with the Local, State and Federal agencies. It is intended to coordinate some of the processes. Within all of the permitting processes is a requirement for mitigation that varies with the type of project and known impacts. Several of the following programs are included in the JARPA (Joint Aquatic Resource Permit Application) process. The processes in the JARPA include:

1. Shoreline Permit Application (Shoreline Exemption, Substantial Development, or Conditional Use)
2. Private Aids to Navigation from the U.S. Coastguard
3. Hydraulic Project Approval (HPA)
4. Aquatic Resource Use Authorization Notification
5. Section 10 Nationwide Permit.

More assistance can be found at the Office of Regulatory Assistance:
http://www.ecy.wa.gov/programs/sea/pac/index.html

3. A Hydraulic Project Approval (HPA) from the Washington State Department of Fish and Wildlife. As proved for in RCW 77.55 Construction projects in state waters: Except as provided in RCW 77.55.031, 77.55.051, and 77.55.041, in the event that any person or government agency desires to undertake a hydraulic project, the person or government agency shall, before commencing work thereon, secure the approval of the department in the form of a permit as to the adequacy of the means proposed for the protection of fish life.

HPAs http://wdfw.wa.gov/hab/hpapage.htm

4. 401 Water Quality Certification from the Washington State Department of Ecology. This certification is authorized through Chapter 90.48 RCW WATER POLLUTION CONTROL. It is declared to be the public policy of the state of Washington to maintain the highest possible standards to insure the purity of all waters of the state consistent with public health and public enjoyment thereof, the propagation and protection of wild life, birds, game, fish and other aquatic life, and the industrial development of the state, and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington.

401 Permits
http://www.ecy.wa.gov/programs/sea/fed-permit/index.html
401 Water Quality Certification Handbook
http://apps.ecy.wa.gov/permithandbook/permitdetail.asp?id=43

5. Authorization from the US Army Corps of Engineers for compliance with Section 404 of the Centennial Clean Water Act.

6. Authorization from the US Army Corps of Engineers for compliance with Section 10 of the Rivers and Harbors Act.

Both #5 and 6 are regulated by using Regional General Permits or Biological Opinions. Some of these are explained below. Regional general permits have limits, both in duration and amount of development that can occur. If either the number or duration criteria are met then the federal agencies would have to coordinate and develop a new or revised permit to allow any type of extensions. Biological opinions can be for an individual project or somewhat programmatic (similar to an RGP).

Regional General Permits- main page
http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=mainpage_RGPs

Regional General Permit 1
Authority: In accordance with 33 CFR 325.2(e)(2), the Seattle District of the U.S. Army Corps of Engineers (Corps) is issuing Regional General Permit 1 (RGP 1) that authorizes watercraft lifts and canopies in certain fresh and marine/estuarine waters within the State of Washington upon the recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act.

Purpose: The purpose of RGP 1 is to authorize watercraft lifts and canopies in certain fresh and marine/estuarine waters within the State of Washington for the purpose of safe watercraft moorage.

Regional General Permit 5
Authority: In accordance with 33 CFR 325.2(e)(2), the U.S. Army Corps of Engineers (Corps) is issuing this regional general permit (RGP [5]) that authorizes certain activities in or affecting waters of the United States, including navigable waters of the United States, upon the recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

Purpose: The purpose of this RGP [5] is to authorize the maintenance, modification and construction of residential overwater structures in the mid-Columbia (Rock Island to Chief Joseph Dam) and lower Okanogan Rivers in Washington State. The section of river where this RGP is applicable is described in “Location of Authorized Activities.” The maintenance, modification and construction of commercial structures or marinas are not authorized by this RGP.

For other actions a Biological Evaluation may be required. For example mooring buoys fall under the “Programmatic Biological Evaluation Mooring Buoys Version: 13 October 2000” which applies for the entire Columbia (as noted in that document). They also require the JARPA and drawings.

7. Landowner or easement holder authorization from one of the Public Utility Districts or from the Real Estate Division of the US Army Corps of Engineers (some entities refer to this as a “permit”). The PUD’s all require an authorization to alter shorelines.

US Army Corps of Engineers
The USACOE easements allow limited uses without restriction, such as passive recreation and grazing, and allow construction of improvements as reviewed and approved by the Corps. Buildings that include human habitation are restricted to a higher extent than barns, corrals or irrigation systems. All of these easements are to an elevation line (except fences). Basic agricultural practices are allowed to be continued (livestock, dryland/irrigated agriculture), with the exception of timber and brush removal.

Douglas County PUD
The Public Utility District No. 1 of Douglas County (District) owns and operates the Wells Hydroelectric Project which is authorized under the Federal Power Act by the Federal Energy Regulatory Commission’s (FERC) License #2149, as amended. All lands within the Wells Project boundary are project lands and are governed by the FERC license. The District also owns or controls certain land rights above the Wells Project boundary which are exercised in connection with the Wells Hydroelectric Project. The District is organized and operates under Title 54 of the Revised Code of Washington. The District also owns land and land rights for electrical and water transmission and distribution systems.

Grant County PUD
Public Utility District No. 2 of Grant County, Washington (Grant PUD) owns and operates the Priest Rapids Hydroelectric Project (Project) under a 50-year license that was issued by the Federal Energy Regulatory Commission (FERC) on November 4, 1955 (FERC Project No. 2114). The Project consists of two developments – Priest Rapids and Wanapum – under the single license. Grant PUD is in the process of obtaining a new FERC license. Within the license a Grant PUD Draft Shoreline Management Plan has been developed.

Chelan County PUD
Chelan County PUD is currently drafting land use policies and should have these available in the near future.

8. A lease from the Washington Department of Natural Resources. Chapter 79.105 RCW Aquatic lands — general. The purpose of RCW 79.105.060, 79.105.230, 79.105.280, and 79.105.010 through 79.105.040 is to articulate a management philosophy to guide the exercise of the state's ownership interest and the exercise of the department's management authority, and to establish standards for determining equitable and predictable lease rates for users of state-owned aquatic lands.

http://www.dnr.wa.gov/htdocs/aqr/
Mooring buoys

http://www.dnr.wa.gov/htdocs/aqr/mooring_bouy/pamphlet_bouys.pdf

9. A building permit from the county or city.

Appendix D. Monitoring and evaluation

In addition to project monitoring required for individual restoration and/or mitigation projects, the cities and the county should conduct system-wide monitoring of shoreline conditions and development activity, to the degree practical, recognizing that individual project monitoring does not provide an assessment of overall shoreline ecological health. The following three-prong approach shall be used:

1. Track information using GIS and the permitting systems as activities occur (development, restoration and mitigation), such as:

e. New shoreline development, by permit type
f. Unresolved compliance issues
g. Mitigation areas
h. Restoration areas

The county or city may require project proponents to monitor as part of project mitigation, which may be incorporated into this process. Regardless, as development and restoration activities occur in the shoreline area, the municipalities should seek to monitor shoreline conditions to determine whether both project specific and SMP overall goals are being achieved.

2. Periodically review and provide input to the regional ongoing monitoring programs/agencies, such as:

h. Washington Dept of Ecology water quality monitoring
i. Douglas County Watershed Planning Unit
j. Foster Creek Conservation District
k. Washington Department of Fish and Wildlife
l. The Nature Conservancy
m. Upper Columbia Salmon Recovery Board
n. The Public Utility Districts

Through this coordination with regional agencies, the municipalities should seek to identify any major environmental changes that might occur.

3. Re-review status of environmental processes and functions at the time of periodic SMP updates to, at a minimum, validate the effectiveness of the SMP. Re-review should consider what restoration activities actually occurred compared to stated goals, objectives and priorities, and whether restoration projects resulted in a net improvement of shoreline resources. Under the Shoreline Management Act, the SMP is required to result in no net loss of shoreline ecological resources. If this standard is found to not be met at the time of review, the county or city will be required to take corrective actions. The goal for restoration is to achieve a net improvement. The cumulative effect of restoration over the time between reviews should be evaluated along with an

assessment of impacts of development that is not fully mitigated to determine effectiveness at achieving a net improvement to shoreline ecological resources.

To conduct a valid reassessment of the shoreline conditions every seven years, it is necessary to monitor, record and maintain key environmental metrics to allow a comparison with baseline conditions.

As monitoring occurs, the county and cities should reassess environmental conditions and restoration objectives. Those ecological processes and functions that are found to be worsening may need to become elevated in priority to prevent loss of critical resources. Alternatively, successful restoration may reduce the importance of some restoration objectives in the future.

Evaluation of shoreline conditions, permit activity, GIS data, and policy and regulatory effectiveness should occur at varying levels of detail consistent with the Regional Shoreline Master Program update cycle. A complete reassessment of conditions, policies and regulations should be considered every seven years.

Appendix E. Tables

1. Location of Environment Designations

Body of Water	Reach	Environment Designation	Legal Start	Legal End
Banks Lake	Banks Lake 1	Natural	S14T26R28 SW 1/4	S14T26R28 NE 1/4
Banks Lake	Banks Lake 1	Natural	S1T26R28 SE 1/4	S1T26R28 SE 1/4
Banks Lake	Banks Lake 1	Natural	S22T26R28 SE 1/4	S22T26R28 SE 1/4
Banks Lake	Banks Lake 1	Natural	S29T25R28 SE 1/4	S29T25R28 SE 1/4
Banks Lake	Banks Lake 1	Natural	S29T28R28 NE 1/4	S20T25R28 SE 1/4
Banks Lake	Banks Lake 1	Natural	S29T28R29 SE 1/4	S29T28R29 SE 1/4
Banks Lake	Banks Lake 1	Natural	S9T25R28 SE 1/4	S4T25R28 SE 1/4
Banks Lake	Banks Lake 2	Rural Conservancy	S22T28R29 SW 1/4	S22T28R29 SE 1/4
Bennett Lake	Bennett Lake	Rural Conservancy	S31T26R26 NW 1/4	S29T26R26 SW 1/4
Bennett Wetlands	Bennett Lake	Rural Conservancy	S30T26R26 SE 1/4	S29T26R26 SW 1/4
Bennett Wetlands	Grimes Lake 4	Rural Conservancy	S30T26R26 SE 1/4	S29T26R26 NW 1/4
Big Bow Lake 1	Big Bow Lake 1	Rural Conservancy	S23T22R21 SW 1/4	S24T22R21 SW 1/4
Big Bow Lake 1	Big Bow Lake 1	Rural Conservancy	S23T22R21 SW 1/4	S23T22R21 SW 1/4
Big Bow Lake 2	Big Bow Lake 2	Natural	S23T22R21 SE 1/4	S23T22R21 SE 1/4
Big Bow Lake 2	Big Bow Lake 2	Rural Conservancy	S23T22R21 SE 1/4	S23T22R21 SE 1/4
Black Lake	Black Lake 1	Natural	S7T30R30 SE 1/4	S7T30R30 SE 1/4
Black Lake	Black Lake 2	Natural	S7T30R30 SE 1/4	S7T30R30 SE 1/4
Blue Heron Lake 1	Blue Heron Lake 1	Rural Conservancy	S26T22R21 NW 1/4	S26T22R21 NW 1/4
Blue Heron Lake 1	Blue Heron Lake 1	Rural Conservancy	S26T22R21 NW 1/4	S26T22R21 NW 1/4
Columbia River and Wetlands	Rock Island 1	Rural Conservancy	RM 453.5	RM 453.95
Columbia River and Wetlands	Rock Island 1	Natural	RM 453.95	RM 454.9
Columbia River and Wetlands	Rock Island 1	Rural Conservancy	RM 454.9	RM 455.5
Columbia River and Wetlands	Rock Island 2	High Intensity	RM 455.5	RM 457.2
Columbia River and Wetlands	Rock Island 3	Rural Conservancy	RM 457.2	RM 459.5
Columbia River and Wetlands	Rock Island 3	Natural	RM 459.5	RM 460.2
Columbia River	Rock Island 3	Rural Conservancy	RM 460.2	RM 461.4

and Wetlands				
Columbia River and Wetlands	Rock Island 4	Shoreline Residential	RM 461.4	RM 461.7
Columbia River and Wetlands	Rock Island 4	Urban Conservancy	RM 461.7	RM 463.7
Columbia River and Wetlands	Rock Island 4	Shoreline Residential	RM 463.7	RM 463.8
Columbia River and Wetlands	Rock Island 4	High Intensity	RM 463.8	RM 464.7
Columbia River and Wetlands	Rock Island 4	Urban Conservancy	RM 464.7	RM 465.5
Columbia River and Wetlands	Rock Island 5	Urban Conservancy	RM 465.5	RM 466.5
Columbia River and Wetlands	Rock Island 5	Natural	RM 466.5	RM 467.3
Columbia River and Wetlands	Rock Island 5	Urban Conservancy	RM 467.3	RM 469.4
Columbia River and Wetlands	Rock Island 6	Natural	RM 469.4	RM 470.3
Columbia River and Wetlands	Rock Island 6	Natural	RM 470.3	RM 473.4
Columbia River and Wetlands	Rock Island 6	Rural Conservancy	RM 473.4	RM 473.7
Columbia River and Wetlands	Rocky Reach 2	High Intensity	RM 455.5	RM 457.2
Columbia River and Wetlands	Rocky Reach 2	Rural Conservancy	RM 473.7	RM 475.4
Columbia River and Wetlands	Rocky Reach 2	Shoreline Residential	RM 475.4	RM 475.8
Columbia River and Wetlands	Rocky Reach 2	Rural Conservancy	RM 475.8	RM 476.8
Columbia River and Wetlands	Rocky Reach 2	Shoreline Residential	RM 476.8	RM 478.1
Columbia River and Wetlands	Rocky Reach 2	Rural Conservancy	RM 478.1	RM 479.9
Columbia River and Wetlands	Rocky Reach 2	Shoreline Residential	RM 479.9	RM 481.8
Columbia River and Wetlands	Rocky Reach 2	Urban Conservancy	RM 481.2	RM 481.4
Columbia River and Wetlands	Rocky Reach 2	Rural Conservancy	RM 481.8	RM 490.3
Columbia River and Wetlands	Rocky Reach 2	Natural	RM 490.3	RM 490.8
Columbia River and Wetlands	Rocky Reach 2	Shoreline Residential	RM 490.8	RM 491.5
Columbia River and Wetlands	Rocky Reach 2	Rural Conservancy	RM 491.5	RM 492.1
Columbia River and Wetlands	Rocky Reach 2	Natural	RM 492.1	RM 492.8
Columbia River and Wetlands	Rocky Reach 2	Shoreline Residential	RM 492.8	RM 494
Columbia River and Wetlands	Rocky Reach 2	Rural Conservancy	RM 494.0	RM 502.1
Columbia River and Wetlands	Rocky Reach 2	Rural Conservancy	RM 502.1	RM 502.5

Columbia River and Wetlands	Rocky Reach 2	Rural Conservancy	RM 502.5	RM 507.6
Columbia River and Wetlands	Rocky Reach 3	Natural	RM 507.6	RM 515.5
Columbia River and Wetlands	Rufus Woods 1	Rural Conservancy	RM 545.5	RM 545.6
Columbia River and Wetlands	Rufus Woods 10	Natural	RM 580.9	RM 589.3
Columbia River and Wetlands	Rufus Woods 10	Rural Conservancy	RM 589.3	RM 589.8
Columbia River and Wetlands	Rufus Woods 10	Natural	RM 589.8	RM 595.7
Columbia River and Wetlands	Rufus Woods 11	See Coulee Dam	RM 595.7	RM 596.3
Columbia River and Wetlands	Rufus Woods 2	Rural Conservancy	RM 545.6	RM 548.2
Columbia River and Wetlands	Rufus Woods 2	Rural Conservancy	RM 546	RM 546
Columbia River and Wetlands	Rufus Woods 2	Rural Conservancy	RM 547.5	RM 547.5
Columbia River and Wetlands	Rufus Woods 3	Rural Conservancy	RM 548.2	RM 550.5
Columbia River and Wetlands	Rufus Woods 4	Natural	RM 550.5	RM 567.7
Columbia River and Wetlands	Rufus Woods 4	Natural	RM 562.5	RM 562.5
Columbia River and Wetlands	Rufus Woods 5	Rural Conservancy	RM 567.7	RM 569
Columbia River and Wetlands	Rufus Woods 6	Natural	RM 569	RM 577.2
Columbia River and Wetlands	Rufus Woods 7	Rural Conservancy	RM 577.2	RM 578.2
Columbia River and Wetlands	Rufus Woods 8	Natural	RM 578.2	RM 580.4
Columbia River and Wetlands	Rufus Woods 9	Rural Conservancy	RM 580.4	RM 580.9
Columbia River and Wetlands	Wanapum 1	Rural Conservancy	RM 441	RM 442.2
Columbia River and Wetlands	Wanapum 2	Shoreline Residential	RM 442.2	RM 442.7
Columbia River and Wetlands	Wanapum 3	Natural	RM 442.7	RM 444.9
Columbia River and Wetlands	Wanapum 4	Natural	RM 444.9	RM 448.5
Columbia River and Wetlands	Wanapum 5	Rural Conservancy	RM 448.5	RM 449.5
Columbia River and Wetlands	Wanapum 6	Rural Conservancy	RM 449.5	RM 452.3
Columbia River and Wetlands	Wanapum 7	Rural Conservancy	RM 452.3	RM 453.5
Columbia River and Wetlands	Wells 1	Natural	RM 515.5	RM 522.9
Columbia River and Wetlands	Wells 2	Rural Conservancy	RM 522.9	RM 530
Columbia River	Wells 2	Natural	RM 530	RM 532.7

and Wetlands				
Columbia River and Wetlands	Wells 2	Rural Conservancy	RM 532.7	RM 533
Columbia River and Wetlands	Wells 3	Natural	RM 533	RM 535.2
Columbia River and Wetlands	Wells 3	Rural Conservancy	RM 535.2	RM 535.6
Columbia River and Wetlands	Wells 3	Natural	RM 535.6	RM 539.5
Columbia River and Wetlands	Wells 3	Natural	RM 538.2	RM 539
Columbia River and Wetlands	Wells 3	Natural	RM 538.2	RM 538.7
Columbia River and Wetlands	Wells 3	Rural Conservancy	RM 538.8	RM 539
Columbia River and Wetlands	Wells 3	Natural	RM 539	RM 539.4
Columbia River and Wetlands	Wells 4	Rural Conservancy	RM 538.6	RM 538.8
Columbia River and Wetlands	Wells 4	Natural	RM 539	RM 539.1
Columbia River and Wetlands	Wells 4	Natural	RM 539.1	RM 539.5
Columbia River and Wetlands	Wells 4	Natural	RM 539.5	RM 540.3
Columbia River and Wetlands	Wells 4	Rural Conservancy	RM 540.3	RM 541
Columbia River and Wetlands	Wells 4	Rural Conservancy	RM 541	RM 541.3
Columbia River and Wetlands	Wells 4	Rural Conservancy	RM 541.3	RM 542.3
Columbia River and Wetlands	Wells 5	Shoreline Residential	RM 542.3	RM 543.1
Columbia River and Wetlands	Wells 5	Mixed Use	RM 543.1	RM 544.4
Columbia River and Wetlands	Wells 5	Urban Conservancy	RM 544.4	RM 545.5
Cornehl Lake	Cornehl Lake 1	Natural	S35T28R24	S35T28R24
Elbow Lake	Elbow Lake 1	Natural	S21T29R28 NE 1/4	S21T29R28 NE 1/4
Elbow Lake	Elbow Lake 1	Natural	S22T29R28 NW 1/4	S22T29R28 NW 1/4
Grimes Lake	Bennett Lake	Rural Conservancy	S30T26R26 SE 1/4	S30T26R26 SE 1/4
Grimes Lake	Grimes Lake 1	Natural	S30T26R26 NE 1/4	S20T26R26 SW 1/4
Grimes Lake	Grimes Lake 2	Natural	S20T26R26 SW 1/4	S20T26R26 NE 1/4
Grimes Lake	Grimes Lake 3	Natural	S29T26R26 NW 1/4	S20T26R26 NE 1/4
Grimes Lake	Grimes Lake 4	Rural Conservancy	S30T26R26 SE 1/4	S29T26R26 NW 1/4
Hammond Lake 1	Hammond Lake 1	High Intensity	S30T22R22 SW 1/4	S30T22R22 NW 1/4

Hammond Lake 2	Hammond Lake 2	Shoreline Residential	S30T22R22 SE 1/4	S30T22R22 NW 1/4
Haynes Lake 1	Haynes Lake 1	Natural	S33T26R27 SE 1/4	S28T26R27 SE 1/4
Hideaway 1	Hideaway 1	Natural	S24T22R21 SE 1/4	S24T22R21 SE 1/4
Hideaway 1	Hideaway 1	Rural Conservancy	S24T22R21 SE 1/4	S24T22R21 SE 1/4
Hideaway 2	Hideaway 2	Rural Conservancy	S24T22R21 SE 1/4	S24T22R21 SE 1/4
Jameson Lake	Jameson Lake 1	Rural Conservancy	S13T25R25 SW 1/4	S12T25R25 SE 1/4
Jameson Lake	Jameson Lake 2	Natural	S13T25R25 SW 1/4	S1T25R25 NE 1/4
Jameson Lake	Jameson Lake 3	Rural Conservancy	S1T25R25 NE 1/4	S6T25R26 NW 1/4
Jameson Lake	Jameson Lake 4	Natural	S12T25R25 SE 1/4	S6T25R26 NW 1/4
Jameson/Bennett Wetlands	Bennett Lake	Rural Conservancy	S31T26R26 NW 1/4	S31T26R26 NW 1/4
Jameson/Bennett Wetlands	Jameson Lake 3	Rural Conservancy	S36T26R25 SE 1/4	S36T26R25 SE 1/4
Klinkhammer Lakes	Klinkhammer Lakes 1	Natural	S20T29R27 NE 1/4	S17T29R27 SE 1/4
Putter's Pond 1	Putter's Pond 1	High Intensity	S30T22R22 SW 1/4	S25T22R21 NE 1/4
Putter's Pond 1 Includes Pit and Marina Lakes	Putter's Pond 1	Shoreline Residential	S25T22R21 NE 1/4	S25T22R21 NE 1/4
Putter's Pond 2 Includes Pit Lake	Putter's Pond 2	Shoreline Residential	S25T22R21 NE 1/4	S30T22R22 NW 1/4
Putter's Pond 3	Putter's Pond 3	High Intensity	S30T22R22 SW 1/4	S30T22R22 NW 1/4
Putter's Pond 4 Includes Pit and Marina Lakes	Putter's Pond 4	High Intensity	S25T22R21 NE 1/4	S25T22R21 NE 1/4
Smith Lake 1	Smith Lake 1	Natural	S7T29R30 SW 1/4	S7T29R30 SW 1/4
Stallard Lake 1	Stallard Lake 1	Natural	S34T26R27 NW 1/4	S28T26R27 SE 1/4
Unnamed 29-29-2 1	Unnamed 29-29-2 1	Rural Conservancy	S2T29R29 SE 1/4	S2T29R29 NE 1/4
Unnamed 29-29-2 2	Unnamed 29-29-2 2	Natural	S2T29R29 SE 1/4	S2T29R29 NE 1/4
Unnamed 29-29-22 1	Unnamed 29-29-22 1	Natural	S22T29R29 SW 1/4	S21T29R29 SE 1/4
Unnamed 30-29-36 1	Unnamed 30-29-36 1	Natural	S36T30R29 SW 1/4	S36T30R29 NW 1/4
Unnamed 30-29-36b 1	Unnamed 30-29-36b 1	Natural	S36T30R29 NE 1/4	S36T30R29 NE 1/4
Unnamed T26R27S32	T26R27S32 1	Natural	S32T26R27 SE 1/4	S32T26R27 SE 1/4
Unnamed T27R28S23	T27R28S23 1	Rural Conservancy	S23T27R28	S23T27R28

Unnamed T27R28S24	T27R28S24 1	Rural Conservancy	S24T27R28 SW 1/4	S24T27R28 SW 1/4
Unnamed T29R28S25	T29R28S25 1	Natural	S25T29R28 NE 1/4	S25T29R28 NE 1/4
Unnamed T29R28S31	T29R28S31 1	Natural	S31T29R28 SW 1/4	S31T29R28 SW 1/4
Wilson Lake 1	Wilson Lake 1	Rural Conservancy	S22T29R29 NE 1/4	S23T29R29 NW 1/4
Wilson Lake 2	Wilson Lake 2	Natural	S22T29R29 NE 1/4	S23T29R29 NW 1/4

Comments

1. Legal descriptions are River Mile to River Mile on the Columbia River, and for lakes a legal description start and end point of each designation, or a site location to the nearest 1/4 section.
2. For those with multiple river miles- in the start column there is a corresponding end point in the end column, in a respective order.

2. Habitat assessment of environment designations

Reach and Environment Designation	Env Designation	Ave Habitat Value Trial 2	Ave Habitat Value Trial 1	Acres
1 Banks Lake 1 Natural	Natural	2.22	46.29	232.2
10 Black Lake 2 Natural	Natural	2.32	62.15	68.7
100 T29R28S25 1 Natural	Natural	2.75	54.00	55.7
101 T29R28S31 1 Natural	Natural	2.75	54.00	45.8
102 Unnamed 29-29-2 1 Rural Conservancy	Rural Conservancy	0.90	4.71	29.6
103 Unnamed 29-29-2 2 Natural	Natural	1.94	14.22	35.4
104 Unnamed 29-29-22 1 Natural	Natural	1.65	9.74	57.8
105 Unnamed 30-29-36 1 Natural	Natural	1.60	9.63	59.8
106 Unnamed 30-29-36b 1 Natural	Natural	1.89	12.57	56.1
107 Wanapum 1 Rural Conservancy	Rural Conservancy	1.30	4.40	43.8
108 Wanapum 2 Shoreline Residential	Shoreline Residential	0.30	0.65	21.1
109 Wanapum 3 Natural	Natural	1.70	14.57	101.7
11 Blue Heron Lake 1 Rural Conservancy	Rural Conservancy	0.41	0.65	40.3
112 Wanapum 4 Natural	Natural	1.33	7.06	156.8
115 Wanapum 5 Rural Conservancy	Rural Conservancy	0.78	3.48	47.4
119 Wanapum 6 Rural Conservancy	Rural Conservancy	1.12	4.42	133.9
12 Cornehl Lake 1 Natural	Natural	2.25	23.40	179.7
120 Wanapum 7 Rural Conservancy	Rural Conservancy	1.00	5.79	61.9
121 Wells 1 Natural	Natural	2.42	40.80	365.8
13 Elbow Lake 1 Natural	Natural	1.68	8.11	55.0
131 Wells 2 Natural	Natural	0.82	1.25	73.0
132 Wells 2 Rural Conservancy	Rural Conservancy	0.42	1.86	349.2
14 Grimes Lake 1 Natural	Natural	2.46	55.00	49.4
140 Wells 3 Natural	Natural	1.35	17.50	277.3
144 Wells 3 Rural Conservancy	Rural Conservancy	0.21	0.49	10.3
145 Wells 3 Rural Conservancy	Rural Conservancy	0.46	0.74	24.0
146 Wells 4 Natural	Natural	0.91	2.54	72.7
147 Wells 4 Rural Conservancy	Rural Conservancy	0.63	1.54	96.7
148 Wells 4 Rural Conservancy	Rural Conservancy	0.67	1.64	17.2
149 Wells 5 Mixed Use	Mixed Use	0.30	1.02	74.8
15 Grimes Lake 2 Natural	Natural	3.00	81.00	45.2
156 Wells 5 Shoreline Residential	Shoreline Residential	0.41	1.33	34.3
157 Wells 5 Urban Conservancy	Urban Conservancy	0.35	0.47	79.3
158 Wilson Lake 1 Rural Conservancy	Rural Conservancy	0.05	0.10	25.9
159 Wilson Lake 2 Natural	Natural	0.91	2.98	51.7
16 Grimes Lake 3 Natural	Natural	2.97	80.27	53.6
17 Grimes Lake 4 Rural Conservancy	Rural Conservancy	2.01	29.27	34.4
18 Hammond Lake 1 High Intensity	High Intensity	0.67	4.66	49.9
19 Hammond Lake 2 Shoreline Residential	Shoreline Residential	0.81	2.39	25.0
20 Haynes Lake 1 Natural	Natural	1.58	6.14	103.3
21 Hideaway Natural	Natural	0.90	11.90	46.9

22 Hideaway Rural Conservancy	Rural Conservancy	1.00	13.78	2.6
23 Hideaway Rural Conservancy	Rural Conservancy	0.90	2.40	7.5
24 Jameson Lake 1 Rural Conservancy	Rural Conservancy	1.01	6.48	75.7
25 Jameson Lake 2 Natural	Natural	2.87	70.93	137.1
3 Banks Lake 2 Rural Conservancy	Rural Conservancy	1.54	13.76	56.8
30 Jameson Lake 3 Rural Conservancy	Rural Conservancy	0.69	2.95	58.3
31 Jameson Lake 4 Natural	Natural	2.79	71.29	67.3
32 Klinkhammer Lakes 1 Natural	Natural	2.22	24.00	104.7
33 Putter's Pond 1 High Intensity	High Intensity	0.32	4.79	21.1
34 Putter's Pond 1 Shoreline Residential	Shoreline Residential	0.20	0.33	18.1
35 Putter's Pond 2 Shoreline Residential	Shoreline Residential	0.54	5.41	24.4
36 Putter's Pond 3 High Intensity	High Intensity	0.27	19.19	19.0
37 Putter's Pond 4 High Intensity	High Intensity	0.94	21.50	11.1
4 Bennett Lake Rural Conservancy	Rural Conservancy	1.72	9.84	147.2
41 Rock Island 1 Rural Conservancy	Rural Conservancy	0.86	3.55	87.9
42 Rock Island 2 High Intensity	High Intensity	1.00	5.69	53.2
43 Rock Island 2 High Intensity	High Intensity	0.89	2.41	30.4
48 Rock Island 3 Natural	Natural	1.10	2.68	37.4
5 Big Bow Lake 1 Rural Conservancy	Rural Conservancy	0.52	1.27	3.7
53 Rock Island 3 Rural Conservancy	Rural Conservancy	0.38	0.70	157.3
54 Rock Island 4 High Intensity	High Intensity	0.99	2.15	42.2
55 Rock Island 4 Shoreline Residential	Shoreline Residential	0.18	0.40	12.0
56 Rock Island 4 Shoreline Residential	Shoreline Residential	0.76	1.77	7.3
57 Rock Island 4 Urban Conservancy	Urban Conservancy	0.51	0.95	38.9
58 Rock Island 4 Urban Conservancy	Urban Conservancy	0.33	0.65	89.9
6 Big Bow Lake 1 Rural Conservancy	Rural Conservancy	0.41	4.97	53.9
62 Rock Island 5 Natural	Natural	0.80	2.28	44.1
64 Rock Island 5 Urban Conservancy	Urban Conservancy	0.86	2.85	158.1
65 Rock Island 6 Natural	Natural	1.16	6.22	158.3
66 Rock Island 6 Natural	Natural	1.27	5.84	54.9
67 Rock Island 6 Rural Conservancy	Rural Conservancy	0.61	0.98	15.8
68 Rocky Reach 1 Natural	Natural	1.64	17.86	160.5
7 Big Bow Lake 2 Natural	Natural	1.00	11.00	19.3
70 Rocky Reach 2 Natural	Natural	1.50	10.22	32.0
72 Rocky Reach 2 Natural	Natural	1.52	10.86	19.6
74 Rocky Reach 2 Rural Conservancy	Rural Conservancy	0.65	1.12	23.8
75 Rocky Reach 2 Rural Conservancy	Rural Conservancy	0.50	1.28	1404.9
76 Rocky Reach 2 Shoreline Residential	Shoreline Residential	0.30	0.74	70.5
77 Rocky Reach 2 Shoreline Residential	Shoreline Residential	0.25	1.80	99.8
78 Rocky Reach 2 Shoreline Residential	Shoreline Residential	0.08	0.17	28.9
79 Rocky Reach 2 Shoreline Residential	Shoreline Residential	0.45	1.40	39.7
8 Big Bow Lake 2 Rural Conservancy	Rural Conservancy	0.91	2.21	18.5

80 Rocky Reach 2 Shoreline Residential	Shoreline Residential	0.29	0.70	60.2
82 Rocky Reach 3 Natural	Natural	2.46	41.57	406.5
83 Rufus Woods 1 Rural Conservancy	Rural Conservancy	0.56	0.90	20.9
85 Rufus Woods 10 Natural	Natural	2.30	35.02	663.0
86 Rufus Woods 10 Rural Conservancy	Rural Conservancy	2.52	39.27	34.9
87 Rufus Woods 11 See Coulee Dam	See Coulee Dam	0.07	0.19	23.7
88 Rufus Woods 2 Rural Conservancy	Rural Conservancy	1.28	5.86	141.0
89 Rufus Woods 3 Rural Conservancy	Rural Conservancy	1.11	6.46	121.3
9 Black Lake 1 Natural	Natural	2.81	60.75	13.0
92 Rufus Woods 4 Natural	Natural	2.33	30.75	903.7
93 Rufus Woods 5 Rural Conservancy	Rural Conservancy	0.93	4.99	59.2
94 Rufus Woods 6 Natural	Natural	2.51	39.31	439.9
95 Rufus Woods 7 Rural Conservancy	Rural Conservancy	1.43	18.67	37.0
96 Rufus Woods 8 Natural	Natural	2.84	71.27	125.4
97 Rufus Woods 9 Rural Conservancy	Rural Conservancy	1.85	9.60	17.9
98 Smith Lake 1 Natural	Natural	2.44	38.53	58.6
99 Stallard Lake 1 Natural	Natural	1.54	4.71	71.3

Averages for designations original habitat	**Sum**	**Average**
Natural	1170.2	28.5
Rural Conservancy	210.1	6.2
Urban Conservancy	4.9	1.2
Shoreline Residential	17.1	1.4
Mixed Use	1.0	1.0
High Intensity	60.4	8.6

Averages for designations revised habitat	**Sum**	**Average**
Natural	78.5	1.9
Rural Conservancy	31.3	0.9
Urban Conservancy	2.1	0.5
Shoreline Residential	4.6	0.4
Mixed Use	0.3	0.3
High Intensity	5.1	0.7

3. Analysis summary of reaches

	Shoreline Totals		Geologic hazardous soils		Wetlands		Priority Habitat Types	
Reach	Length (mi)	Acres	Acres	Percent area	Types (NWI)	% area	Habitats	% area
Wanapum 1	1	44.0	43.2	98.2	L/R-OW	12.6	Shrub steppe	62.6
					L2US1&2		Tree component	1.7
					L2US5		Talus	0.4
					PAB3		Cliff	2.5
					PFO6			
Wanapum 2	0.6	28.6	27.3	95.4	L/R-OW	2.3	Shrub steppe	8.6
					L2US1&2		Tree component	2.3
					PAB3			
					PFO6			
Wanapum 3	2.1	95.4	76.3	80.0	L/R-OW	11.4	Shrub steppe	69.3
					L2US1&2		Tree component	0.5
					L2US5		Talus	13.6
					PAB3			
					PFO6			
Wanapum 4	2.5	110.1	70.5	64.0	L/R-OW	9.9	Shrub steppe	80.5
					L2US1&2		Talus	0.1
					L2US5		Island	1.5
					PAB3			
					PFO6			

Wanapum 5	2.1	93.1	40.5	43.5	L/R-OW	14.5	Shrub steppe	48.6
					L2US1&2		Tree component	2.6
					L2US5		Talus	3.6
					PAB3		Island	1.5
					PFO6			
Wanapum 6	2.8	155.7	53.7	34.5	L/R-OW	9.8	Shrub steppe	47.9
					L2US1&2		Tree component	4.1
					L2US5		Island	16.5
					PAB3			
					PFO6			
Wanapum 7	1.1	66.1	63.1	95.5	R-OW	0	Shrub steppe	12.6
					L2RS1&2		Cliff	0.7
					L2US1&2		Talus	46.4
Rock Island 1	2.5	128.7	32.3	25.1	L/R-OW	33.7	Shrub steppe	15.1
					L2AB3			
					L2RS1&2		Talus	2.3
					L2US5		Tree component	5.8
					PFO6		Island	4.6
Rock Island 2	1.2	67.7	14.6	21.6	L/R-OW	4.3	Shrub steppe	56.2
					L2AB3			
					L2RS1&2		Island	0.5
					L2US5		Talus	0.3

Rock Island 3	4.3	206.2	42	20.4	L/R-OW	6.4	Shrub steppe	40.5
					L2AB3			
					L2RS1&2		Talus	2.9
					L2US5		Tree component	0.4
					PFO6		Island	10.2
Rock Island 4	4.1	194.8	21	10.8	L/R-OW	5.3	Shrub steppe	40.6
					L2AB3			
					L2RS1&2		Talus	1
					L2US5		Tree component	4.5
					PFO6			
Rock Island 5	4.8	258.4	53.8	20.8	L/R-OW	34.3	Shrub steppe	43.1
					L2AB3			
					L2RS1&2		Talus	0.4
					L2US5		Tree component	13.2
					PFO6		Island	1.8
Rock Island 6	3.4	177.3	42.1	23.7	R-5OW	41.8	Shrub steppe	29.8
					L2AB3		Talus	6.1

					L2US1			
					L2US5		Tree component	24.7
					PFO6			
Rocky Reach 1 (Turtle Rock)	2.9	160.5	29.8	18.6	L/R-OW	1.8	Shrub steppe	93
					L2AB3			
					L2RS2			
					L2US5		Tree component	
					PFO6			
Rocky Reach 2	34.2	1854.8	903.8	48.7	L/R-OW	13.4	Shrub steppe	23.6
					L2AB3		Cliff	0.1
					L2RS1&2		Talus	4.5
					L2US5		Tree component	8.1
					PFO6		Island	0.1
Rocky Reach 3	7.7	394.7	275.4	69.8	L/R-OW	1.5	Shrub steppe	88.1
					L2AB3			
					L2RS1&2			
					L2US1			
					L2US5		Island	0.1
Wells 1	7.8	399.5	253.7	63.5	L/R-OW	4.1	Shrub steppe	84.4
					L2US1&2		Island	
					L2US5			
					PAB3			

Wells 2	6.7	321.4	55.8	17.4	L/R-OW	20.4	Shrub steppe	16.3
					L2US1&2		Tree component	1.8
					L2US5		Island	2
					PAB3			
					PFO6			
Wells 3	9	453.8	71.4	15.7	L/R-OW	24.2	Shrub steppe	25.5
					L2US1&2		Tree component	1.3
					L2US5		Island	10.8
					PAB3			
					PFO6			
Wells 4	3.3	204.2	67.7	33.2	L/R-OW	25.7	Shrub steppe	44.7
					L2US1&2			
					L2US5			
					PAB3			
Wells 5	2.7	144.3	27.8	19.3	R-OW	13.2	Shrub steppe	32.1
					L2US1&2		Talus	6.6
					L2US5		Island	0.4
Rufus Woods 1	0.8	95.6	8.2	8.6	L/R-OW	0	Shrub steppe	29.6
					L2US1		Talus	10

Rufus Woods 10	0.5	721.7	446.5	61.9	L/R-OW	0.5	Shrub steppe	84.8
					L2US1		Island	6.3
					L2US5		Talus	3.3
Rufus Woods 11	14.8	23.5	23.2	98.5	R-OW	0	Shrub steppe	0.2
					L2US1		Talus/rock armor	70
Rufus Woods 2	2.7	140.7	99.2	70.5	L/R-OW	6.4	Shrub steppe	83.7
					L2US1			
					L2US5			
Rufus Woods 3	2.3	121.4	40.2	33.1	L/R-OW	0.5	Shrub steppe	62.6
					L2US1			
					L2US5			
Rufus Woods 4	17.4	944.4	547.1	57.9	L/R-OW	10.6	Shrub steppe	74.5
					L2US1		Island	4.6
					L2US5			
					PAB5			
					PSS6			

Rufus Woods 5	1	42.4	17.5	41.3	L/R-OW	17.8	Shrub steppe	26.3
					L2US1			
					L2US5			
Rufus Woods 6	8.3	440.2	267.8	60.8	L/R-OW	6.5	Shrub steppe	78.9
					L2US1			
					L2US5			
					PAB5			
					PFO6			
					PSS6			
Rufus Woods 7	0.9	35.4	11.6	32.7	L/R-OW	0	Shrub steppe	81.1
					L2US1			
Rufus Woods 8	2.3	125.3	88.3	70.5	L/R-OW	0.9	Shrub steppe	70.1
					L2US1			
					L2US5			
Rufus Woods 9	0.5	19.3	0	0.0	L/R-OW	0	Shrub steppe	100
					L2US1			
Banks Lake 1	4.7	232.2	232.2	100.0	L-OW	4.7	Talus	49.5
					L2RS2		Shrub steppe	39.7

					L2US1			
					L2US5		Cliff	
Banks Lake 2	1.3	57.0	57	100.0	L-OW	4.6	Shrub steppe	81.2
					L2RS2		Tree component	0.2
					L2US1			
					L2US5		Island	0.8
					PFO6			
Bennett Lake	1.7	167.3	134.9	80.6	L-OW-I	69	Shrub steppe	29
					L2AB3			
					L2US1			
					L2US5			
Big Bow Lake 1	1.1	58.5	5	8.5	L-OW	69.9	Shrub steppe	6.4
					L2AB3			
					L2US1			
					L2US5		Tree component	29.2
					PFO6			
					PSS6			
Big Bow Lake 2	0.7	36.5	3.8	10.4	L-OW	24.5	Shrub steppe	65.6
					L2AB3			
					L2US5		Tree component	1.3
					PFO6			
					PSS6			
Black Lake 1	0.3	13.0	12.8	98.8	L-OW-I	90.1	Tree component	74.2

					L2US1			
					L2US5		Talus	9.9
					PFO6			
Black Lake 2	1.3	68.7	62.2	90.5	L-OW-I	6.6	Shrub steppe	91.6
					L2US1			
					L2US5		Tree component	
Blue Heron Lake 1	0.8	40.3	0	0.0	L-OW	27.7	Shrub steppe	19.1
					L2AB3			
					L2US5		Tree component	27.7
					PFO6			
					PSS6			
Cornehl Lake 1	0.9	179.7	162.3	90.3	L-OW	97.3	Shrub steppe	2.5
					L2AB3			
					L2US5			
					PEM1			
					PSS6			
Elbow Lake 1	4.1	55.0	16.7	30.3	L-OW-I	12.2	Shrub steppe	87.8
					L2US1			
					L2US5			
					PSS6			
Grimes Lake 1	1.1	50.3	41	81.6	L-OW-I	9.2	Shrub steppe	81.3
					L2US1			

					L2US5		Talus	5.6
					PSS6			
Grimes Lake 2	1	45.2	41.6	92.1	L-OW-I	13.6	Shrub steppe	86.3
					L2US1			
					L2US5			
					PSS6			
Grimes Lake 3	1.2	52.9	48.4	91.4	L-OW-I	11.9	Shrub steppe	60.9
					L2US1			
					L2US5		Tree component	0.8
					PFO6		Cliff	7.8
					PSS6		Talus	19.5
Grimes Lake 4	0.8	33.3	31.7	95.3	L-OW-I	26.5	Shrub steppe	69.8
					L2US1			
					L2US5			
					PSS6			
Hammond Lake 1	1.2	49.4	6.5	13.2	L-OW	13	Shrub steppe	7.7
					L2AB3			
					L2US5		Tree component	13
					PFO6			
					PSS6			
Hammond Lake 2	0.6	24.3	6.7	27.6	L-OW	14.9	Shrub steppe	53
					L2AB3			
					L2US5		Tree component	14.9

					PFO6			
					PSS6			
Haynes Lake 1	1.5	103.3	62.6	60.6	L-OW-I	60.6	Shrub steppe	39.3
					L2US1			
					L2US5			
					PSS6			
Hideaway Lake 1	0.5	32.7	3.6	11.0	L-OW	63.8	Shrub steppe	19.2
					L2AB3			
					L2US5		Tree component	
					PFO6			
					PSS6			
Hideaway Lake 2	0.4	24.3	7	28.8	L-OW	13.8	Shrub steppe	86.2
					L2AB3			
					L2US5		Tree component	11.2
					PFO6			
					PSS6			
Jameson Lake 1	1.7	75.9	73.8	97.2	L-OW-I	4.4	Shrub steppe	58.8
					L2US1			
					L2US5		Talus	0.3
					PSS6			
Jameson Lake 2	3.2	143.1	117.2	81.9	L-OW-I	2	Shrub steppe	47.9
					L2US1		Island	8.3
					L2US5		Tree component	0.6

					PFO6		Cliff	15.9
					PSS6		Talus	25.8
Jameson Lake 3	1.3	58.3	24.7	42.4	L-OW-I	26.7	Shrub steppe	6
					L2US1			
					L2US5		Tree component	4.2
					PFO6		Cliff	1.6
					PSS6		Talus	2.2
Jameson Lake 4	1.5	67.0	66.8	99.6	L-OW-I	0	Shrub steppe	19.9
					L2US1		Talus	17.1
							Cliff	16.6
Klinkhammer Lakes 1	2.1	104.7	37.6	35.9	L-OW-I	11.6	Shrub steppe	88.4
					L2US1			
					L2US5			
Putter's Pond 1	0.5	17.7	0.5	2.8	L-OW	5.7	Shrub steppe	5.2
					L2US1			
					PFO6		Tree component	5.7
Putter's Pond 2	0.8	26.2	0.2	0.8	L-OW	10.9	Shrub steppe	17.2
					PFO6		Tree component	10.9
							Island	1.4

Putter's Pond 3	0.5	16.7	0.6	3.6	L-OW	0		
					L2US1			
Putter's Pond 4	0.3	11.2	0	0.0	L-OW	19.6	Tree component	19.6
					L2US1			
					PFO6		Island	0.7
Putter's Pond 5	0.4	14.8	0	0.0	L-OW	3.3	Tree component	3.3
					L2US1			
					PFO6			
Putter's Pond 6	0.2	7.0	0	0.0	L-OW	11.5	Shrub steppe	41.5
					PFO6		Tree component	11.5
Smith Lake 1	1				L2US1			
z Algae bloom 2004 photo		58.6	52.2	89.1	L-OW	10.2	Shrub steppe	82.7
					L2US5			
					PSS6			
Stallard Lake 1	0.9	71.3	54.6	76.6	L-OW	100		
					L2US2			
					L2US5			

Unnamed 29-29-2 1	0.5	29.6	27.4	92.6	L-OW-I	17.4	Shrub steppe	39.7
					L2US2			
					L2US5			
Unnamed 29-29-2 2	0.6	35.4	31.3	88.4	L-OW-I	61.6	Shrub steppe	38.4
					L2US2			
					L2US5			
Unnamed 29-29-22 1	1	57.8	13.7	23.7	L-OW-I	10.6	Shrub steppe	89.4
					L2US2			
					L2US5			
Unnamed 30-29-36 1	0.9	59.8	27.3	45.7	L-OW-I	43.7	Shrub steppe	56
					L2US1&2			
					L2US5			
					PEM1			
Unnamed 30-29-36b 1	0.9				L2US2			
z Algae bloom 2004 photo		56.1	12.1	21.5	L-OW	43.1	Shrub steppe	56.9
z May be slightly alkaline.					L2US5			
					PFO6			
Wilson Lake 1	0.5	25.9	17.5	67.5	L-OW-I	0	Shrub steppe	2.9
					L2US2			

Wilson Lake 2	1	51.7	34.1	66.0	L-OW-I	58.6	Shrub steppe	13.9
					L2US2			
					L2US5			
Unnamed 29-28-25	1	56	47.6	85.0	L-OW-I	21	Shrub steppe	100
					L2US2			
Unnamed 29-28-31	0.7	46	13.8	30.0	L-OW-I	21	Shrub steppe	100
					L2US2			

	Land Use						Alterations				
Reach	**Ave parcel size**	**Public acres**	**% Public Lands**	**Zoning**	**Acres**	**% area**	**# of docks**	**# of Boat launches**	**Impervious surfaces %**	**Percent roads**	**Average Habitat #**
Wanapum 1	5.1	20.0	45.5	RREC	44.2	100.0			0.6	0.6	4.9
				PRD	35.1	79.4					
Wanapum 2	5.5	7.4	25.9	RREC	26.5	92.8	2	1	11.5	2.9	0.6
				RR20	2.1	7.2					

Wanapum 3	22.7	47.6	49.9	AC10	0.1	0.1			1.7	1.7	15.6
				RR20	95.3	99.9					
Wanapum 4	114.2	57.6	52.3	AC10	105.5	95.8		1	7.9	7.8	10.4
				RR20	4.6	4.2					
Wanapum 5	229.9	2.6	2.8	AC10	92.4	99.3		1	11.9	11.8	5.4
				RR20	0.7	0.8					
Wanapum 6	86.2	52.8	33.9	AC10	77.4	49.7		1	10.7	10.7	5.2
				RR20	78.3	50.3					
Wanapum 7	120.2	66.1	100	RR20	66.1	100			40.1	40.1	2.9
					0.0						
Rock Island 1	24.3	111.5	86.6	RL	0.5	0.4	1		25	16.4	17
				RR20	60.9	47.3					
				AC10	31.4	24.4					
				PU	6.2	4.8					

Rock Island 2	13.4	11.3	16.7	RR2	0.1	0.1			6.1	5.4	8.7
				IG	52.7	77.8					
				C	0.2	0.3					
				PU	6.0	8.9					
Rock Island 3	3.8	86.0	41.7	RM	0.6	0.3	17	2	9.4	6.4	3.2
				IG	0.0	<0.1					
				AC10	0.0	<0.1					
				RR2	202.6	92.7					
				PRD	15.3	7					
				RR20	0.0	<0.1					
Rock Island 4	3.6	125.1	64.2	RL	20.3	10.4	1	1	24.1	23.6	1.1
				RH	7.1	3.6					
				RO	48.1	24.7					
				RM	8.3	4.3					
				RR2	1.2	0.6					
				CBD	40.9	21.0					
				COP	17.3	8.9					
				CT	25.0	12.8					
				GC	15.0	7.7					
				WI	11.6	6.0					
Rock Island 5	5.3	224.3	86.8	RL	108.3	41.9		1	13.2	11	5
				AC5	2.6	1.0					
				RH	26.7	10.3					
				RM	34.9	13.5					
				CT	50.3	19.5					
				GC	15.5	6.0					
				WI	20.1	7.8					
Rock Island 6	39.7	169.6	95.7	RL	0.0	<0.1			2	0	7.1
				AC5	97.1	54.8					
				AC10	80.1	45.2					
Rocky Reach 1 (Turtle	208.3	160.5	100	RR20	160.5	100	1		0	0	15.4

Rock)											
					0.0						
Rocky Reach 2	14.3	480.4	25.9	RO	153.9	8.3	77	9	15.1	12.1	3.1
				AC10	48.2	2.6					
				RREC	294.9	15.9					
				RSC	146.5	7.9					
				RR5	934.8	50.4					
				RR20	276.4	14.9					
Rocky Reach 3	168.6	374.5	94.9	RR20	394.7	100			0.2	0.2	35
Wells 1	88.3	151.8	38	AC10	20.4	5.1			7.3	0.2	36.4
				RR20	379.1	94.9					
Wells 2	22.5	86.1	26.8	AC10	305.3	95			8.2	7.4	4.2
				RR20	15.7	4.9					
Wells 3	31.9	334.0	73.6	RSC	0.5	0.1			4.8	4.6	17.1
				RR5	172.5	38					
				RR20	280.9	61.9					
Wells 4	10.2	91.9	45	PU	0.2	0.1			4.9	4.2	3.8
				RSC	27.4	13.4					

				RR5	99.6	48.8					
				AC10	47.2	23.1					
				RR20	29.6	14.5					
Wells 5	1.6	89.9	62.3	PU	127.5	88.3	2	2	21.2	11.5	3
				AC10	0.4	0.3					
				R3 (MF)	9.1	6.3					
				RR20	7.4	5.1					
Rufus Woods 1	88.4	94.8	99.2	PU	61.3	64.1	3	1	60.1	1.6	0.6
				RR20	34.3	35.9					
Rufus Woods 10	144.2	256.2	35.5	AD	122.7	17			0.8	0.8	33.8
				RR20	599.0	83					
Rufus Woods 11	7.3	12.7	53.9	RR20	0.0	0.1			4.4	4.2	0.2
				City CD	23.5	99.9					
Rufus Woods 2	38.2	69.8	49.6	AD	28.0	19.9			10	9.9	6.1
				AC10	86.8	61.7					
				RR20	25.9	18.4					
Rufus Woods 3	77.3	15.1	12.4	AC10	121.4	100			1.5	1.5	7.5
Rufus Woods 4	113.3	668.6	70.8	AD	13.2	1.4			1	0.9	30.8

				AC10	26.4	2.8					
				RR20	904.7	95.8					
Rufus Woods 5	78.8	0.1	0.2	AD	10.2	24.1			6.3	6.3	0.8
				RR20	32.1	75.8					
Rufus Woods 6	90.9	124.6	28.3	AD	281.7	64			0	0	39.9
				RR20	158.5	36					
Rufus Woods 7	91.6	0.0	<0.1	AD	32.9	92.9			0	0	16.5
				RR20	2.5	7					
Rufus Woods 8	162.2	53.6	42.8	AD	21.9	17.5			0	0	74.9
				RR20	103.3	82.5					
Rufus Woods 9	246.9	0.0	0	AD	19.3	100			0	0	12
Banks Lake 1	226.5	227.1	97.8	AD	22.3	9.6			2.4	2.4	43.4
				RR20	209.9	90.4					
Banks Lake 2	277.2	57.0	100	RR20	57.0	100	1*	1*	6.8	5.4	12.6

Bennett Lake	253.9	9.5	5.7	RR20	167.3	100			1.7	1.7	9.7
Big Bow Lake 1	4.2	16.1	27.6	RL	4.4	7.5		1	8.9	6.6	1.1
				RR5	0.2	0.3					
				RR2	53.9	92.2					
Big Bow Lake 2	11.8	8.0	22	RR2	16.7	45.8			6.3	5.9	2.7
				RR5	19.7	54.1					
Black Lake 1	360.7	0.0	0	RR20	13.0	100			0	0	67.5
Black Lake 2	370.9	0.0	0	RR20	68.7	100			1.8	1.8	55.4
Blue Heron Lake 1	4.7	3.5	8.8	RR2	40.3	100			16.2	15.3	0.8

Cornehl Lake 1	218.8	0.2	0.1	AD	17.1	9.5			0.2	0.2	23.1
				RR20	162.7	90.5					
Elbow Lake 1	644.3	55.0	100	AD	26.7	48.6			0	0	6.6
				RR20	28.3	51.4					
Grimes Lake 1	214.9	0.0	0	RR20	50.3	100		1	0.3	0.3	55.4
Grimes Lake 2	176	0.0	0	RR20	45.2	100			0	0	81
Grimes Lake 3	135.1	0.0	0	RR20	52.9	100			0	0	81
Grimes Lake 4	174.7	0.0	0	RR20	33.3	100			3.7	3.7	32.7
Hammond Lake 1	15.3	39.8	80.5	MR	10.1	20.8		2	2.8	2.8	1.2
				RR20	0.1	0.2					
				RL	0.0	0.01					
				PU	38.3	78.9					

Hammond Lake 2	28.5	3.5	14.3	MR	#VALUE!	<0.1			20.4	20.4	1.9
				AC10	2.0	8.3					
				RL	7.4	30.4					
				RR20	13.7	56.2					
				PU	1.2	5					
Haynes Lake 1	124.4	0.0	0	AD	103.3	100	1		0	0	5.6
Hideaway Lake 1	3.9	14.1	43.3	RL	7.2	22			3.1	0	2.7
				RR5	10.4	31.9					
				RR2	15.1	46.2					
Hideaway Lake 2	23.8	17.6	72.4	RR2	4.1	16.8			0	0	4
				RR5	20.1	83					
Jameson Lake 1	105.9	65.9	86.8	RR20	75.9	100		2	30	22.7	6.2
Jameson Lake 2	123.4	71.4	49.9	RR20	143.1	100			0	0	74.6
Jameson Lake 3	277.8	0.3	0.5	RR20	58.3	100	2	1	19	4.2	3

Jameson Lake 4	190.3	32.2	48.1	RR20	67.0	100			0	0	76.5
Klinkhammer Lakes 1	265.9	1.8	1.7	AD	0.5	0.5			0	0	24
				RR20	104.2	99.5					
Putter's Pond 1	1	4.4	25	MR	0.0	0.1			28.4	16.1	0.4
				C	3.2	18.3					
				PU	3.1	17.6					
				RL	11.3	64.2					
Putter's Pond 2	16.2	9.5	36.2	MR	19.4	77.3			26.2	26.2	1.2
				PU	5.7	22.8					
				RL	0.0	0.1					
Putter's Pond 3	11.8	16.7	100	PU	16.7	100			0	0	0
Putter's Pond 4	8.3	10.5	94.4	PU	7.1	64.6			0	0	1.8
				CT	3.9	35.4					
Putter's Pond 5	6.5	5.3	35.8	PU	0.2	1.8			29.9	20.8	0.5
				CT	12.7	98.2					

Putter's Pond 6	3.8	0.0	0	RR20	1.1	15.7			11.3	11.3	1.5
				C	0.1	1.4					
				RL	5.8	82.9					
Smith Lake 1											
z Algae bloom 2004 photo	603.2	0.0	0	AD	25.5	43.5			0	0	34.1
				RR20	33.1	56.5					
Stallard Lake 1	90.1	0.0	0	AD	71.3	100			0	0	4.8
Unnamed 29-29-2 1	520.8	0.0	0	AD	26.8	90.4			0	0	5.3
				RR20	2.8	9.6					
Unnamed 29-29-2 2	501.1	0.0	0	AD	27.3	77.1			0	0	13.5
				RR20	8.1	23					
Unnamed 29-29-22 1	160.3	0.0	0	AD	57.8	100			0	0	9.9
Unnamed 30-29-36 1	230.3	12.1	20.3	AD	6.2	10.3			0.2	0	9.5
				RR20	53.6	89.7					
Unnamed 30-29-36b 1											
z Algae bloom 2004 photo	239.3	0.0	<0.1	AD	56.1	100			0	0	12.6
z May be slightly alkaline.											

Wilson Lake 1	120.6	0.0	0	AD	17.8	68.6			6.6	4.6	0.1
				RR20	8.1	31.3					
Wilson Lake 2	203.3	0.0	0	AD	31.3	60.5			0.6	0.6	81
				RR20	20.4	39.5					
Unnamed 29-28-25	480	0	0	AD	56.0	100			0	0	54
Unnamed 29-28-31	323	160	50	RR20	27.6	60			0	0	54
				AD	18.4	40					

4. Reach break justifications

Reach	Length Mi	Start TRS or RM	Reach break justification	End
Wanapum 1	1.0	441.2	Southern Douglas County Line.	442.2
Wanapum 2	0.6	442.2	Urban level development and shoreline alterations.	442.83
Wanapum 3	2.1	442.83	Mostly natural environment.	444.9
Wanapum 4	2.5	444.9	Somewhat disturbed with access points (some non-permitted activities).	447.38
Wanapum 5	2.1	447.38	Mostly natural environment- Moses Coulee drainage ends here.	449.45
Wanapum 6	2.8	449.45	Somewhat disturbed with access points (some non-permitted activities).	452.28
Wanapum 7	1.1	452.28	Section is heavily armored with rock- railroad, dam and SR28.	453.42
Rock Island 1	2.5	453.42	Rock Island Dam.	455.94
Rock Island 2	1.2	455.94	Industrial uses, railroad.	457.12
Rock Island 3	4.3	457.12	Mixed agriculture and rural residential, not in UGA.	461.4

Rock Island 4	4.1	461.4	A more urbanized environment with substantial impervious surfaces (City of East Wenatchee) in UGA.	465.45
Rock Island 5	4.8	465.45	Somewhat of a protected environment with the loop trail and WSDOT ROW, in UGA.	470.22
Rock Island 6	3.4	470.22	Dominated by irrigated agriculture, some protection via trail system, out of UGA.	473.6
Rocky Reach 1	2.9	475	Turtle Rock Island	476
Rocky Reach 2	34.2	473.6	Rocky Reach Dam- agricultural uses with areas of near urban density of development (Orondo, Sun Cove, Bauer's Landing)	507.77
Rocky Reach 3	7.7	507.77	Above Beebe Bridge, remote area- mostly a natural environment.	515.5
Wells 1	7.8	515.5	Wells Dam, remote area- mostly a natural environment.	523.32
Wells 2	6.7	523.32	Agricultural uses dominate- Brewster Bridge	530
Wells 3	9.0	530	DCPUD/WDFW wildlife areas on Bridgeport Bar	539
Wells 4	3.3	539	Agricultural uses dominate	542.29
Wells 5	2.7	542.29	City of Bridgeport city limits- urbanized environment	544.95
Rufus Woods 1	0.8	544.95	Chief Joseph Dam and facilities	545.72
Rufus Woods 2	2.7	545.72	Mixed land use, irrigated and dryland agriculture, natural environs	548.38
Rufus Woods 3	2.3	548.38	Primary land use natural environs plus >30% irrigated agriculture	550.65
Rufus Woods 4	17.4	550.65	Primary land use natural, and 70% public ownership- some irrigated and dryland agriculture.	568
Rufus Woods 5	1.0	568	Dryland agriculture influence plus natural environs (<27%), significant wetland areas	569
Rufus Woods 6	8.3	569	Dryland agriculture land use plus significant natural areas- 28% public ownership	577.26
Rufus Woods 7	0.9	577.26	Primarily natural with no public ownership and dryland agriculture land use	578.12
Rufus Woods 8	2.3	578.12	Primarily natural with some dryland agriculture land use- >40% public ownership	580.39
Rufus Woods 9	0.5	580.39	All natural environs	580.86
Rufus Woods 10	14.8	580.86	Primarily natural with talus and islands	595.69
Rufus Woods 11	0.5	595.69	City of Coulee Dam city limits- urbanized environment	596.23
Banks Lake 1	4.7	T25R28S29 SE1/4	Primarily surrounded by rock, cliff and talus habitats- broken in several sections along county line.	T28R29S29 SE1/4
Banks Lake 2	1.3	T28R29S22 SW1/4	Barker Canyon area- significantly less rock/cliff/talus on shoreline	T28R29S22 NE1/4
Bennett Lake	1.7	T26R26 S29,30,31	No breaks- all like area- alkaline lake with significant wetland areas surrounded by shrub steppe. Intermediate lake, between Grimes and Jameson Lakes.	
Big Bow Lake 1	1.1	T22R21S23 SW1/4	Denser residential development, south side mostly	T22R21S24 SW1/4
Big Bow Lake 2	0.7	T22R21S24 SW1/4	Much of area in natural state, mostly north side	T22R21S23 SW1/4

Black Lake 1	0.3	T20R30S8 SW1/4	This reach has talus/rock and significant forest habitat components, alkaline water	T20R30S7 SE1/4
Black Lake 2	1.3	T20R30S7 SE1/4	This reach is almost completely shrub steppe, alkaline water	T20R30S8 SW1/4
Blue Heron Lake 1	0.8	T22R21S23 SW1/4	No breaks- all like area some rural development surrounds lake.	T22R21S26 NW1/4
Cornehl Lake 1	0.9	T28R24 S35,26,25,36	No breaks- all like area- significant wetland area in relative isolation.	
Elbow Lake 1	0.9	T29R28S22	No breaks- all like area- remote lake, mostly shrub steppe, alkaline water	
Grimes Lake 1	1.1	T26R26 S29 NW1/4	Alkaline lake, area with significant rock/cliff/talus habitats immediately adjacent to it and rocky shrub steppe	T26R26 S20 SW 1/4
Grimes Lake 2	1.0	T26R26 S20 SW 1/4	Alkaline lake, area with shrub steppe dominating and isolated wetland areas	T26R26 S20 NE 1/4
Grimes Lake 3	1.2	T26R26 S20 NE 1/4	Alkaline lake, area with significant rock/cliff/talus habitats immediately adjacent to it and rocky shrub steppe- two separate ponded areas	T26R26 S29 NW1/4
Grimes Lake 4	0.8	T26R26 S29 NW1/4	Alkaline lake, area with significant wetland areas that lead through a channel to Bennett Lake, and then to Jameson Lake	T26R26 S29 NW1/4
Hammond Lake 1	1.2	T22R22S30 SW1/4	Denser residential development and golf course	T22R22S30 NW1/4
Hammond Lake 2	0.6	T22R22S30 NW1/4	Much of area adjacent to irrigated agriculture, significant tree component, although heavy Russian olive.	T22R22S30 SW1/4
Haynes Lake 1	1.5	T26R27 S28,33	No breaks- all like area- alkaline lake with significant wetland areas surrounded by shrub steppe	
Hideaway Lake 1	0.5	T22R21S23 SW1/4	Denser residential development, south side mostly	T22R21S23 SW1/4
Hideaway Lake 2	0.4	T22R21S23 SW1/4	Much of area in natural state, mostly north side	T22R21S23 SW1/4
Jameson Lake 1	1.7	T25R25 S12 SE 1/4	Alkaline lake, area with significant recreational development, much of which is state owned	T25R25 S13 SW 1/4
Jameson Lake 2	3.2	T25R25 S13 SW 1/4	Alkaline lake, area with significant rock/cliff/talus habitats immediately adjacent to it and rocky shrub steppe	T25R25 S1 NE 1/4
Jameson Lake 3	1.3	T25R25 S1 NE 1/4	Alkaline lake, area with significant recreational development and irrigated agriculture	T25R26 S6 NW 1/4
Jameson Lake 4	1.5	T25R26 S6 NW 1/4	Alkaline lake, area with significant rock/cliff/talus habitats immediately adjacent to it and rocky shrub steppe	T25R25 S12 SE 1/4
Klinkhammer Lakes 1	2.1	T29R27 S20,17	No breaks- all like area- two alkaline lakes, nearly identical and within 250 feet of each other, mostly shrub steppe	
Putter's Pond 1	0.5	T22R21S25 NE1/4	Surrounds part of Pit Lake (juvenile fishing pond) as well- primarily residential development	T22R21S25 NE1/4
Putter's Pond 2	0.8	T22R21S24 SE1/4	Surrounds part of Pit Lake (juvenile fishing pond) as well- primarily recreational with road separating uplands (undeveloped, but in UGA).	T22R22S30 NW1/4

Putter's Pond 3	0.5	T22R22S30 NW1/4	Primarily recreational developed (golf course).	T22R22S30 SW1/4
Putter's Pond 4	0.3	T22R22S30 SW1/4	Rock, sand and gravel- this reach is all the dividing lanes between the small lakes making up this area. Has many trees (cottonwoods).	T22R21S25 NE1/4
Putter's Pond 5	0.4	T22R21S25 NE1/4	Area with rock, sand and gravel mining operations	T22R21S25 NE1/4
Putter's Pond 6	0.2	T22R21S25 NE1/4	Primarily residential	T22R21S25 NE1/4
Smith Lake 1	1.0	T29R30S7	No breaks- all like area- unknown water quality (has algae bloom in 2004 photo) dominated by shrub steppe.	
Stallard Lake 1	0.9	T26R27 S27,28,33,34	No breaks- all like area- Extensive wetlands surrounded by shrub steppe	
Unnamed 29-29-2 1	0.5	T29R29S2 NE1/4	Alkaline lake with shrub steppe and dryland agriculture dominating area	T29R29S2 NE1/4
Unnamed 29-29-2 2	0.6	T29R29S2 NE1/4	Alkaline lake with extensive wetlands, plus shrub steppe	T29R29S2 NE1/4
Unnamed 29-29-22 1	1.0	T29R29 S21,22	No breaks- all like area- shrub steppe dominating area	
Unnamed 30-29-36 1	0.9	T30R29 S35,36	No breaks- all like area- extensive wetlands, plus shrub steppe	
Unnamed 30-29-36b 1	0.9	T30R29S36 NE1/4	No breaks- all like area- extensive wetlands, plus shrub steppe	
Wilson Lake 1	0.5	T29R29S22 NE1/4	Dryland agriculture and a farm dominates area	T29R29S23 NW1/4
Wilson Lake 2	1.0	T29R29S23 NW1/4	Extensive wetlands, plus shrub steppe	T29R29S22 NE1/4

Appendix F. Shoreline inventory maps

Appendix G. Shoreline Reach Maps

Appendix H. Shoreline critical area regulations

This appendix to the Douglas County Regional Shoreline Master Program (RSMP) incorporates into the RSMP shoreline critical area regulations for the county and cities as they apply within the shoreline jurisdiction. As a regional document, this RSMP contains each jurisdiction's separate critical areas regulation. However, the applicability of the sections listed here are limited to the jurisdiction noted in each section. Development within the individual jurisdictions will be required to comply with those sections listed for that particular jurisdiction.

1. City of Bridgeport shoreline critical area regulations
2. City of Rock Island shoreline critical area regulations
3. City of East Wenatchee shoreline critical area regulations
4. Douglas County shoreline critical area regulations

1. City of Bridgeport shoreline critical area regulations (Insert Here)

2. City of Rock Island shoreline critical area regulations (Insert Here)

3. City of East Wenatchee shoreline critical area regulations (Insert Here)

4. Douglas County shoreline critical area regulations

CHAPTER 1 CRITICAL AREAS--GENERAL PROVISIONS

1.010 Purpose.

The purpose of this chapter is to implement the Shoreline Management Act's policy of protection of shoreline natural resources through the protection and encouraged restoration of ecological functions necessary to sustain these resources; in conjunction with the other provisions of this Program.

1.020 Applicability.

A. When a chapter reference is used, it shall be inclusive of all of Appendix H.

B. The provisions of this chapter shall apply to all development activities within the shoreline jurisdiction of unincorporated Douglas County. Any development authorized to alter the condition of any land, water or vegetation; or to alter or construct any building, structure or improvement shall be in compliance with the requirements of this chapter.

C. In the event the provisions of this Program conflict with provisions of federal, state, county or city regulations, the provision that is the most protective of shoreline resources shall prevail, when consistent with SMA policy.

1.030 Reference maps and inventories.

The distribution of critical areas within Douglas County are described and displayed in reference materials and on maps maintained by Douglas County Land Services. These reference materials, in the most current form, are intended for general information only and do not depict site-specific designations. They are intended to advise Douglas County, applicants and other participants in the development permit process that a critical area may exist and that further study, review and consideration may be necessary. These reference materials shall include but are not limited to the following:

A. Maps.
   1. Natural Resource Conservation Service Soils Maps and Data, updated in 2007, as amended;
   2. Douglas County Steep Slopes Maps and Data, as amended;
   3. Flood Insurance Rate Maps (1978 and 1982) as amended;
   4. Flood Boundary and Floodway Maps (1978 and 1982) as amended;
   5. US Fish and Wildlife Service National Wetlands Inventory, as amended;
   6. U.S.G.S. 7.5 Minute Series Topographic Quadrangle Maps;
   7. Aerial photos;
   8. WDFW Priority Habitats and Species and Wildlife Heritage Maps and Data, 2001, as amended; and

9. Stream functional types developed using the USGS hydrology dataset and aerial photo interpretation of riparian vegetation presence by Chuck Jones, Alliance Consulting Group, Inc., 2007.

B. Documents.
1. Approved special reports previously completed for the subject property may be allowed if the site conditions are the same as observed in the previously developed report. Wetland delineation reports older than five years typically need to be updated in order to meet state and federal requirements;
2. The Flood Insurance Study for the Unincorporated Areas (1978, revised 1982)as amended;
3. Douglas County Countywide Comprehensive Plan, as amended;
4. Natural Resources Conservation Service Soil Survey -- Douglas County Soils Survey, as amended;
5. Federal Wetlands Delineation Manual (1987, as amended);
6. Washington State Wetlands Identification and Delineation Manual (WDOE #96-94, March 1997, as amended);
7. Washington State Wetlands Rating System for Eastern Washington-Revised (WDOE 04-06-015, as amended);
8. Management Recommendations for Washington's Priority Habitats and Species, May 1991, as amended;
9. Management Recommendations for Washington's Priority Habitats- Riparian, December 1997, as amended;
10. Priority Habitats and Species List, July 1999, as amended;
11. US Army Corps of Engineers. (2006). Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. Wetlands Regulatory Assistance program, Environmental Lab ERDC/EL TRT-06-16, as amended;
12. Wetlands in Washington State- Volume 1: A Synthesis of the Science. Washington State Department of Ecology. Publication #05-06-006; and
13. Wetlands in Washington State- Volume 2: Guidance for Protecting and Managing Wetlands. Washington State Department of Ecology. Publication #05-06-008.

1.040 Disclosure.
The presence of any known or suspected critical areas on or within two hundred feet of property that is the subject of a development permit shall be identified by the applicant in the application materials submitted to Douglas County.

1.050 Review process.
Provisions of this chapter shall be considered and applied appropriately during development permit application reviews within shoreline jurisdiction. Review of development within frequently flooded areas, fish and wildlife habitat conservation areas and wetlands and any associated buffers within shoreline jurisdiction that does not require a development permit application shall be subject to the provisions of Section 1.080C of Appendix H.

1.060 Mitigation, maintenance, monitoring and contingency.

A. Mitigation, maintenance, monitoring and contingency plans shall be implemented by the developer to protect critical areas and their buffers as specified by the provisions of this Program.

B. The property owner shall be responsible for reporting to Douglas County Land Services and undertaking appropriate corrective action when monitoring reveals a significant deviation from predicted impacts or a failure of mitigation or maintenance measures.

1.070 Surety.

If a development proposal is subject to mitigation, maintenance or monitoring plans, an assurance device or surety may be required by the review authority in accordance with Chapter 7, of this Program.

1.080 Special reports.

A. In order to maintain and protect critical areas, as well as to assist in classifying and designating such areas, site-specific environmental information will be required when evaluating a development proposal.

B. Special reports shall be submitted for review and approval in conjunction with development applications when required by the review authority. Each chapter dealing with a specific critical area contains a description of when special reports may be required.

C. When no other application review process is required, final special reports shall be reviewed and approved pursuant to Chapter 7, subsection 7.3.020 or subsection 7.3.030 of this Program, as determined by the Administrator.

1.090 Special reports--responsibility for completion.

The preparation of special reports or tests required by this chapter is the responsibility of the applicant. Costs incurred by the county to engage technical consultants or for staff review and interpretation of data and findings submitted by or on behalf of the developer or applicant shall be reimbursed by the applicant in accordance with a schedule adopted by Douglas County.

1.100 Drainage and erosion control plan.

During project development the following standards apply:

A. All drainage and erosion control plans shall be prepared by an engineer or other qualified person as approved by the reviewing authority.

B. All drainage and erosion control plans shall address methods to minimize and contain soil within the project boundaries during construction and to provide for stormwater drainage from the site and its surroundings during and after construction.

C. All drainage and erosion control plans shall be prepared in conformance with the provisions of Section 4.2 Water Quality and the provisions of this Program; in addition to conformance with applicable state and local standards.

1.110 Geotechnical reports and analysis

A. Geotechnical reports and analysis shall be in conformance with Chapter 4 of Appendix H, and all applicable provisions of this Program.

1.120 Grading and excavation plan.

All grading and excavation plans shall be prepared by a professional engineer licensed to practice in the State of Washington, and it shall contain the following information:

A. A cover sheet showing the general vicinity and specific location of work, the name and address of the owner and the licensed civil engineer who prepared the plans;

B. Property limits and accurate contours of existing ground and details of terrain and area drainage.

C. Limits of proposed excavation and fill sites, finished contours and proposed drainage systems and/or facilities, including an estimated runoff served by the systems and/or facilities;

D. Location of any buildings or structures on the property where the work is to be performed and the location of any buildings or structures on land of adjacent owners which are within fifteen feet of the property;

E. Recommendations included in any soil engineering reports and/or an engineering geology reports shall be incorporated in the grading plans or specifications.

CHAPTER 2 CRITICAL AREAS--WETLANDS

2.010 Authorized uses and activities.

Uses and activities allowed within designated wetlands or associated wetland buffers are those uses authorized by the Douglas County Regional Shoreline Master Program, subject to the provisions of this chapter.

2.020 Identification and rating.

A. All wetlands shall be identified and delineated in Douglas County to reflect the relative function, value and uniqueness of the wetland using the Washington State Wetlands Identification and Delineation Manual (WDOE, March 1997, as amended); in conjunction with the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1987, as amended); and the US Army Corps of Engineers, (2006), Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Wetlands Regulatory Assistance Program, Environmental Lab ERDC/EL TRT-06-16, as amended. Douglas County may use the following information sources as guidance in identifying the presence of wetlands and the subsequent need for a wetland delineation study:
   1. Hydric soils, soils with significant soil inclusions, and "wet spots" identified within the Douglas County soil survey;
   2. National Wetlands Inventory;
   3. Previous wetland rating evaluation; and,
   4. On-site inspection.

B. Wetland boundary surveys and rating evaluations shall be conducted by a qualified professional biologist and use the Washington State Wetland Rating System for Eastern Washington-Revised(WDOE 04-06-015, as amended). The wetland boundary shall be field staked by the biologist and surveyed by a land surveyor for disclosure on all final plats, maps, etc.

C. The Administrator may waive the requirement for the survey for development if:
   1. The proposed development is not within three hundred feet of the associated wetlands; and
   2. There is adequate information available on the area proposed for development to determine the impacts of the proposed development and appropriate mitigating measures.

D. The wetland boundary and any associated buffer area shall be identified on all plats, maps, plans and specifications submitted for the project.

E. An evaluation of any unrated wetland is necessary when there is a proposed development or activity to be located adjacent to, or within an area containing a wetland.

2.030 Designation.
Sites classified in accordance with the provisions of Section 2.020 of Appendix H are designated as wetlands.

2.035 Wetland management and mitigation plan.

A. A wetland management and mitigation plan shall be required when impacts associated with development within a wetland or wetland buffer are unavoidable, demonstrated by compliance with Section 2.035G of Appendix H.

B. Wetland management and mitigation plans shall be prepared by a qualified professional biologist who is knowledgeable of wetland conditions within North Central Washington.

C. In determining the extent and type of mitigation appropriate for the development, the plan shall evaluate the ecological processes that affect and influence critical area structure and function within the watershed or sub-basin; the individual and cumulative effects of the action upon the functions of the critical area and associated watershed; and note observed or predicted trends regarding specific wetland types in the watershed, in light of natural and human processes.

D. Where compensatory mitigation is necessary, the plan should seek to implement shoreline restoration objectives identified within the Douglas County Shoreline Restoration Plan, Appendix B.

E. The wetland management and mitigation plan shall demonstrate, when implemented, that there shall be no net loss of the ecological functions of the wetland and buffer area.

F. The wetland management and mitigation plan shall identify how impacts from the proposed project shall be mitigated, as well as the necessary monitoring and contingency actions for the continued maintenance of the wetland and its associated buffer.

G. Mitigation Sequence.
When an alteration or impact to a critical area is proposed, the biologist shall demonstrate that all reasonable efforts have been taken to mitigate impacts in the following prioritized order:

1. Avoiding the adverse impact altogether by not taking a certain action or parts of an action, or moving the action.
2. Minimizing adverse impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology and engineering, or by taking affirmative steps to avoid or reduce adverse impacts.
3. Rectifying the adverse impact by repairing, rehabilitating or restoring the affected environment.
4. Reducing or eliminating the adverse impact over time by preservation and maintenance operations during the life of the action.

5. Compensating for the adverse impact by replacing, enhancing, or providing similar substitute resources or environments.
6. Monitoring the impact and taking appropriate corrective measures.

Mitigation for development may include a sequenced combination of the above measures as needed to achieve the most effective protection or compensatory mitigation for critical area functions.

H. Mitigation Ratios.

Mitigation ratios shall be used when impacts to wetlands and/or wetland buffers cannot be avoided. Compensatory mitigation shall restore, create, rehabilitate or enhance equivalent or greater wetland and wetland buffer functions. Mitigation shall be located onsite unless the biologist can demonstrate, and the county approves that onsite mitigation will result in a net loss of ecological functions. If offsite mitigation measures are determined to be appropriate, offsite mitigation shall be located in the same watershed as the development, within Douglas County.

The mitigation ratios (mitigation amount:disturbed area) for impacts to wetlands by wetland type and buffer are:

Wetland Category	**Reestablishment or Creation[1,2]**	**Rehabilitation[1,2]**	**Enhancement[1,3] Only**
Category IV	1.5:1	3:1	6:1
Category III	2:1	4:1	8:1
Category II	4:1	8:1	16:1
Category I	6:1	8:1	24:1

[1]Natural heritage sites, alkali wetlands, and bogs are considered irreplaceable wetlands because they perform special functions that cannot be replaced through compensatory mitigation. Impacts to such wetlands would therefore result in a net loss of some functions no matter what kind of mitigation is provided.

[2]Provides gains in a whole suite of functions both at the site and landscape scale. Rehabilitation actions often focus on restoring environmental processes that have been disturbed or altered by previous or ongoing human activity. (restore environmental process of previous disturbances)

[3] Actions which provide gains in only a few functions. Enhancement actions often focus on structural or superficial improvements to a site and generally do not address larger scale environmental processes. (structural or superficial actions)

The mitigation ratios (mitigation amount:disturbed area) for impacts to the wetland buffer are 1:1 for development within the buffer; and a ratio of 2:1 for native vegetation removal within a buffer. Mitigation within wetland buffers for diverse, high quality habitat or offsite mitigation may require a higher level of mitigation. Wetland management and mitigation plans shall evaluate the need for a higher mitigation ratio on a site by site basis, dependent upon the ecological functions provided by the buffer area. Recommendations by resource agencies in evaluating appropriate buffer mitigation shall be encouraged.

I. Plan Contents.

The wetland management and mitigation plan shall contain a report that includes, but is not limited to, the following information:

1. Location maps, regional 1:24,000 and local 1:4,800;
2. A map or maps indicating the boundary delineation of the wetland; the width and length of all existing and proposed structures, utilities, roads, easements; wastewater and stormwater facilities; and adjacent land uses;
3. A description of the proposed project including the nature, density and intensity of the proposed development and the associated grading, structures, utilities, etc., in sufficient detail to allow analysis of such land use change upon the identified wetland and wetland buffer;
4. A detailed description of vegetative, faunal and hydrologic conditions, soil and substrate characteristics, and topographic features within and surrounding the wetland;
5. A detailed description of vegetative, faunal and hydrologic conditions, soil and substrate characteristics, and topographic features within any compensation site;
6. A detailed description of the proposed project's effect on the wetland and wetland buffer, and a discussion of any federal, state or local management recommendations which have been developed for the area;
7. A plan which explains how any adverse impacts created by the proposed development will be mitigated to ensure no net loss of ecological function. Methods may include, but are not limited to the following techniques:
   a. Establishment of buffer zones,
   b. Preservation of critically important plants and trees,
   c. Limitation of access to the wetland area,
   d. Seasonal restriction of construction activities,
   e. Establishment of a monitoring program within the plan,
   f. Drainage and erosion control techniques,
   g. Direct lights away from the wetland and buffer,
   h. Locate facilities that generate substantial noise away from the wetland and buffer,
   i. Establish covenants limiting the use of pesticides within one hundred-fifty feet of the wetland,
   j. Implement integrated pest management programs,
   k. Post signs at the outer edge of the critical area or buffer to clearly indicate the location of the critical area according to the direction of the county,

l. Plant buffer with native vegetation appropriate for the region to create screens or barriers to noise, light, human intrusion and discourage domestic animal intrusion, and
m. Use low impact development where appropriate.

8. A detailed discussion of on-going management practices which will protect the wetland after the project site has been fully developed, including proposed monitoring, contingency, maintenance and surety programs as provided for in Section 2.035 J of Appendix H.
9. A narrative which addresses Section 2.035 A-H of Appendix H.
10. A description of the biologist's qualifications and experience.

J. Performance Standards.

The following performance standards shall apply to compensatory mitigation projects:

1. Specific criteria shall be provided in the mitigation plan for evaluating whether or not the goals and objectives of the mitigation project are being met. Such criteria may include percent aerial cover and survival rates of planted vegetation, species abundance and diversity targets, habitat diversity indices, water quality improvement, flood retention, or other ecological, geological or hydrological criteria. Unless the site specific criteria dictate otherwise, default performance standards for the site shall meet mitigation planting survival of 100% for the first year and 80% plant survival for each of the 4 years following initial planting.
2. Mitigation must be installed no later than the next growing season after completion of site improvements, unless otherwise approved by the Administrator.
3. Where necessary, a temporary means of irrigation shall be installed for the mitigation plantings within the wetland, that are designed by a landscape architect or equivalent professional, as approved by the Administrator. Where necessary, the administrator may require a permanent means of irrigation be installed for mitigation plantings within the wetland buffer, given the arid conditions of the region. The design shall meet the specific needs of the wetland, riparian and shrub steppe vegetation, as may be applicable.
4. Monitoring reports by the biologist must include verification that the planting areas have less than 20% total non-native /invasive plant cover consisting of exotic and/or invasive species. Exotic and invasive species may include any species on the state noxious weed list or considered a noxious or problem weed by the Natural Conservation Services Department or local conservation districts.
5. Onsite monitoring and monitoring reports shall be submitted to Douglas County Transportation and Land Services 1 year after mitigation installation; 3 years after mitigation installation; and 5 years after mitigation installation. Monitoring reports shall be submitted by a qualified professional biologist. The biologist must verify that the conditions of approval and provisions in the wetland management and mitigation plan have been satisfied.
6. Mitigation sites shall be maintained to ensure that the mitigation and management plan objectives are successful. Maintenance shall include corrective actions to rectify problems, include rigorous, as-needed elimination of

undesirable plants; protection of shrubs and small trees from competition by grasses and herbaceous plants, and repair and replacement of any dead plants.

7. Prior to site development and or building permit issuance, a performance surety agreement in conformance with Chapter 7 of this Program, must be entered into by the property owner and Douglas County. The surety agreement must include the complete costs for the mitigation and monitoring which may include but not be limited to: the cost of installation, delivery, plant material, soil amendments, permanent irrigation, seed mix, and 3 monitoring visits and reports by a qualified professional biologist, including Washington State Sales Tax. Douglas County must approve the quote for said improvements.
8. Sequential release of funds associated with the surety agreement shall be reviewed for conformance with the conditions of approval and the mitigation and management plan. Release of funds may occur in increments of 1/3 for substantial conformance with the plan and conditions of approval. Verification of conformance with the provisions of the mitigation and management plan and conditions of approval after 1 year of mitigation installation shall also allow for the full release of funds associated with irrigation systems, clearing and grubbing and any soil amendments. If the standards that are not met are only minimally out of compliance and contingency actions are actively being pursued by the property owner to bring the project into compliance, the county may choose to consider a partial release of the scheduled increment. Non-compliance can result in one or more of the following actions: carryover of the surety amount to the next review period; use of funds to remedy the nonconformance; scheduling a hearing with the Douglas County Hearing Examiner to review conformance with the conditions of approval and to determine what actions may be appropriate.

2.040 Application requirements.

Development permit applications shall provide appropriate information on forms provided by the review authority, including without limitation the information described below. Additional reports or information to identify potential impacts and mitigation measures to wetlands may be required if deemed necessary. Development within a wetland or its buffer shall provide the following information:

A. Wetland boundary survey and rating evaluation pursuant to Section 2.020 of Appendix H;

B. Wetland management and mitigation plan pursuant to Section 2.035 of Appendix H;

2.050 General standards.

The following minimum standards shall apply to all development activities occurring within designated wetlands and/or their buffers.

A. Except where permitted by this Program, wetlands and wetland buffers will be left undisturbed, unless the development proposal demonstrates that impacts to the wetland and/or buffer are unavoidable, demonstrated by compliance with Section 2.035G of Appendix H. Impacts must be addressed with appropriate mitigation and

enhancement measures as determined on a site-specific basis in conformance with Section 2.035 of Appendix H.

B. Wetland Buffers

Appropriate buffer areas shall be maintained between all permitted uses and activities and the designated wetland. Provisions to identify the type of wetland and delineate its boundary are established in Section 2.020 of Appendix H, and must be conducted by a qualified professional biologist.

1. The width of a wetland buffer, as measured from the wetland edge established in the approved wetland boundary survey, shall be as follows:

Wetland Type	**Low – Moderate Intensity Dev.**	***High Intensity Development**
Wetland Type 1	150 feet.	250 feet
Wetland Type 2	100 feet	200 feet
Wetland Type 3	75 feet	150 feet
Wetland Type 4	50 feet	50 feet

* For the purposes of Section 2.050B of Appendix H, high intensity uses include: commercial, industrial, institutional, retail sales, residential (greater than 1 unit/acre), conversion from non-agricultural lands to high-intensity commercial agriculture (dairies, nurseries, hobby farms, feed mills, packing plants, agricultural processing plants or warehouses for the purposes of processing, packing, and storage of agricultural products), and high-intensity recreation (golf courses, ball fields).

2. Where a wetland is located within a riparian buffer, the buffer width, riparian or wetland, which provides the greatest degree of protection shall apply.
3. All buffers shall be measured from the wetland edge, as established by the approved wetland boundary survey.
4 All buffer areas shall be temporarily fenced between the construction activity and the buffer with a highly visible and durable protective barrier during construction to prevent access and protect the designated wetland and associated buffer. The Administrator may waive this requirement if an alternative to fencing which achieves the same objective is proposed and approved.
5. Except as otherwise allowed, buffers shall be retained in their natural condition. Any habitat created, restored or enhanced as compensation for approved wetland alterations shall have the standard buffer required for the category of the created, restored or enhanced wetland.
6. Land divisions within designated wetland areas shall require a minimum lot frontage along the protective buffer or shoreline as outlined in this Program.
7. The width of the buffer shall be increased by the Administrator for a development project on a case-by-case basis when a larger buffer is necessary to protect the designated wetland function and value. The determination shall be based on site-specific and project-related conditions which include, without limitation:
   a. The designated wetland is used for feeding, nesting and resting by species proposed or listed by the federal or state government as endangered, threatened, sensitive, candidate, monitor or critical; or if it is outstanding

potential habitat for those species or has unusual nesting or resting sites such as heron rookeries or raptor nesting trees;

b. The adjacent land is susceptible to severe erosion and erosion control measures will not effectively prevent adverse wetland impacts;

C. Buffer Width Averaging.

Standard buffer widths may be modified by the Administrator for single family dwellings, for existing legal lots of record in place at the time of adoption of this Program, a development proposal by averaging buffer widths based on a report submitted by the applicant and prepared by a qualified professional biologist. Buffer width averaging shall only be allowed where the applicant demonstrates all of the following:

1. Averaging is necessary to avoid an extraordinary hardship to the applicant caused by circumstances peculiar to the property;
2. The designated wetland contains variations in sensitivity due to existing physical characteristics or the character of the buffer varies in slope, soils, or vegetation;
3. The width averaging shall not adversely affect or impact the designated wetland and buffer's functional value;
4. The total area contained within the buffer after averaging is no less than that contained within the standard buffer prior to averaging.
5. The minimum buffer width of a Category I - IV wetland at it's narrowest point shall not be less than seventy-five (75) percent of the widths established under Section 2.050B of Appendix H;
6. The wetland buffer has not been reduced under any other provisions of this chapter. The buffer has not been varied or reduced by any prior actions administered by Douglas County. Sites which utilize buffer width averaging are not eligible for any future buffer width reductions under any other provisions of this Program, except as administered under Section 6.8 Variances.
7. The variation of buffer widths on a site, via buffer width averaging, must be supported by best available science as demonstrated by the submittal and approval of a wetland management and mitigation plan in conformance with Section 2.035 of Appendix H.

D. Administrative Buffer Reduction.

The Administrator shall have the authority to reduce buffer widths on a case-by-case basis for single family dwelling units which would be placed on existing legal lots of record in place at the time of adoption of this Program; provided that the general standards for avoidance and minimization per Section 2.035G of Appendix H shall apply, and when the applicant demonstrates to the satisfaction of the Administrator that all of the following criteria have been met:

1. The buffer reduction shall not result in a net loss of functions of the wetland or wetland buffer.
2. The maximum buffer width reduction allowed shall not exceed twenty-five (25) percent.

3. The buffer width reduction is contingent upon the submittal and approval of a wetland management and mitigation plan in conformance with Section 2.035 of Appendix H.
4. The buffer has not been varied or reduced by any prior actions administered by Douglas County. Sites which utilize administrative buffer width reductions are not eligible for any future buffer width reductions, under any other provisions of this Program, except as administered under Section 6.8 Variances.

E. High Intensity Development – Administrative Buffer Reduction.
The Administrator shall have the authority to reduce buffer widths on a case-by-case basis for high intensity development associated with Type 1-3 wetlands, within legal lots of record in place at the time of adoption of this Program. For the purposes of this section, high intensity development is defined by Section 2.050(B)1 of Appendix H. The general standards for avoidance and minimization per Section 2.035G of Appendix H shall apply and the applicant must demonstrate to the satisfaction of the Administrator that all of the following criteria have been met:
1. The buffer reduction shall not result in a net loss of functions of the wetland or wetland buffer.
2. The maximum buffer width reduction allowed shall not exceed twenty-five (25) percent.
3. The buffer width reduction is contingent upon the submittal and approval of a wetland management and mitigation plan in conformance with Section 2.035 of Appendix H.
4. The buffer has not been varied or reduced by any prior actions administered by Douglas County. Sites which utilize administrative buffer width reductions are not eligible for any future buffer width reductions, under any other provisions of this Program, except as administered under Section 6.8 Variances, of this Program.

2.060 Specific standards.
The following standards shall apply to the activity identified below, in addition to the general standards outlined in Section 2.050 of Appendix H.

A. Developments which contain a wetland or wetland buffer on site shall comply with the following minimum standards:
1. All plats shall disclose the presence on each residential lot one building site, including access, that is suitable for development and which is not within the designated wetland or its associated buffer;
2. All designated wetland areas and their proposed buffers shall be clearly identified on all final plats, maps, documents, etc;
3. Designated wetlands and their associated wetland buffers shall be designated and disclosed on the final plats, maps, documents, etc., as critical area tracts, nonbuildable lots and buffer areas or common areas. Ownership and control may be transferred to a homeowner's association or designated as an easement or covenant encumbering the property.

4. All lots within a major subdivision, short plat or binding site plan shall have the outer edge of all required buffers clearly marked on site with permanent buffer edge markers. Buffer markers may be either buffer signs or steel posts painted with a standard color and label, as approved by the Administrator. The markers shall be field verified by the surveyor or biologist of record prior to final plat approval. Each lot shall contain a minimum of three buffer area markers located at the landward edge of the buffer perimeter for each habitat type; one located at each side property line and one midway between side property lines. Covenants for the subdivision shall incorporate a requirement stating that buffer area markers shall not be removed, or relocated, except as a may be approved by the Administrator.
5. Residential developments with the potential for two or more dwelling units shall disclose on the face of the plat whether the development will be served by joint use or community dock facilities or a combination thereof. Access easements and dock locations shall be identified by a qualified professional biologist who will address the standards of Section 2.035G of Appendix H. The identification of access easements and dock locations is not a substitute for permitting required in order to develop moorage facilities and in no way guarantees such an approval.

B. Stream Crossings. Expansion or construction of stream crossings may be authorized within a designated wetland or wetland buffer, subject to the following minimum standards:
   1. Bridges are required for streams which support salmonids;
   2. All crossings using culverts shall use superspan or oversize culverts;
   3. Crossings shall not occur in salmonid spawning areas unless no other feasible crossing site exists;
   4. Bridge piers or abutments shall not be placed in either the floodway or between the ordinary high water marks unless no other feasible alternative placement exists;
   5. Crossings shall not diminish flood carrying capacity; and
   6. Crossings shall serve multiple properties whenever possible.

C. Water dependant uses, as defined by this Program, may be located within a wetland or wetland buffer when the applicant or property owner can demonstrate compliance with Section 2.035 of Appendix H.

D. Trails and trail-related facilities.
   Construction of public, private community and private trails and trail-related facilities, such as picnic tables, benches, interpretive centers and signs, viewing platforms and campsites may be authorized within designated resource lands and critical areas, subject to the following minimum standards:
   1. Trail facilities shall, to the extent feasible, be placed on existing road grades, utility corridors, or any other previously disturbed areas;
   2. Trail facilities shall minimize the removal of trees, shrubs, snags and important habitat features. Vegetation management performed in accordance with best

management practices as part of ongoing maintenance to eliminate a hazard to trail users is considered consistent with this standard;

3. Viewing platforms, interpretive centers, campsites, picnic areas, benches and their associated access shall be designed and located to minimize disturbance of wildlife and/or critical characteristics of the affected conservation area;
4. All facilities shall be constructed with materials complementary to the surrounding environment;
5. Trail facilities that parallel the shoreline may be located in the outer 25 percent of the buffer area; and
   a. Commercial and public trails shall not exceed 10 feet in width
   b. Private trails shall not exceed 4 feet in width;
6. Except as provided in D.5 above, the width of commercial and public trails shall be consistent with Section 1020.06(1) of the Washington State Design Manual as in now exists or may hereafter be amended;
7. Trails that provide direct shoreline access shall not exceed 4 feet in width and shall be kept to the minimum number necessary to serve the intended purpose;
8. Review and analysis of a proposed trail facility shall demonstrate no net loss of ecological functions and values in conformance with this chapter; and
9. Trail facilities shall not be exempt from special report requirements, as may be required by this chapter.

2.070 Variances.

Applicants who are unable to comply with the specific dimensional or performance standards of this Chapter may seek approval pursuant to the variance standards of Section 6.8 Variances of this Program, in addition to satisfying the requirements identified below:

A. The project includes mitigation for unavoidable critical area and buffer impacts, consistent with the requirements of Section 2.035 of Appendix H.

B. The applicant can clearly demonstrate compliance with the avoidance and minimization standards established in subsection 2.035G of Appendix H.

CHAPTER 3 CRITICAL AREAS--
FISH AND WILDLIFE HABITAT CONSERVATION AREAS

3.010 Authorized uses and activities.
Uses and activities allowed within designated habitat conservation areas are those uses authorized by the Douglas County Regional Shoreline Master Program, subject to the provisions of this chapter.

3.020 Identification.
A. All fish and wildlife habitat conservation areas shall be identified by Douglas County to reflect the relative function, value and uniqueness of the habitat area as established through an approved habitat ranking evaluation submitted by an applicant for development occurring on a site, in accordance with this Program. Douglas County may use the information sources in Section 1.030 of Appendix H as guidance in identifying the presence of potential fish and wildlife habitat conservation areas and the subsequent need for a habitat boundary survey along with an onsite inspection, if necessary.

B. Fish and wildlife habitat conservation areas include:
   1. Areas in which endangered, threatened, and sensitive species have a primary association;
   2. Habitats and species of local importance;
   3. Naturally occurring ponds under twenty acres and their submerged aquatic beds that provide fish or wildlife habitat;
   4. Waters of the state;
   5. Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity;
   6. State natural area preserves and natural resource conservation areas;
   7. Riparian areas;
   8. Lakes 20 acres and greater in size with a water depth of 6 feet or greater; or
   9. Intermittent and perennial streams.
   10. Priority habitats and species as identified by the Washington State Department of Fish and Wildlife Priority Habitats and Species Program.

C. Identification and regulation of all wetlands, lakes 20 acres or greater in size with a depth less than 6 feet, lakes under 20 acres in size, and ponds, shall be in accordance with Appendix H-Chapter 2 Critical Areas-- Wetlands.

D. Identification and regulation of ephemeral or intermittent drainages which do not contain wetland or riparian habitat shall be in accordance with Appendix H–Chapter 4 Critical Areas--Geologically Hazardous Areas and Appendix H- Chapter 6 Flood Damage Prevention.

3.030 Designation.
All existing areas of unincorporated Douglas County identified as stated in Section 3.020 of Appendix H, as determined by the Administrator, are designated as fish and

wildlife habitat conservation areas. In addition to existing fish and wildlife habitat conservation areas of unincorporated Douglas County identified as stated in Section 3.020 of Appendix H, the County may designate additional species, habitats of local importance, and/or wildlife corridors as follows:

A. In order to nominate an area, species, or corridor to the category of Locally important, an individual or organization must:
    1. Demonstrate a need for special consideration based on:
        a. Declining population,
        b. Sensitivity to habitat manipulation,
        c. Commercial, recreational, cultural, or other special value, or
        d. Maintenance of connectivity between habitat areas.
    2. Propose relevant management strategies considered effective and within the scope of this chapter;
    3. Identify effects on property ownership and use; and
    4. Provide a map showing the species or habitat location(s).

B. Submitted proposals shall be reviewed by the county and may be forwarded to the State Departments of Fish and Wildlife, Natural Resources, and/or other local, state, federal, and/or tribal agencies or experts for comments and recommendations regarding accuracy of data and effectiveness of proposed management strategies.

C. If the proposal is found to be complete, accurate, and consistent with the purposes and intent of this chapter and the various goals and objectives of the Douglas County Countywide Comprehensive Plan, the Growth Management Act, the Shoreline Management Act and this Program; the Board of County Commissioners will hold a public hearing to solicit comment. Approved nominations will then be processed as amendments to this Program in conformance with Chapter 7, in order to be considered as a designated locally important habitats, species, or corridors and if approved will be subject to the provisions of this chapter.

3.035 Habitat boundary survey.

A. A wildlife habitat boundary survey and evaluation shall be conducted by a qualified professional biologist, as appropriate, who is knowledgeable of wildlife habitat within North Central Washington. The wildlife habitat boundary shall be field staked by the biologist and surveyed by a land surveyor for disclosure on all final plats, maps, etc.

B. The Administrator may waive the requirement for the survey for minor development if:
    1. The proposed development is not within the extended proximity of the associated wildlife habitat;
    2. There is adequate information available on the area proposed for development to determine the impacts of the proposed development and appropriate mitigating measures; and
    3. The applicant provides voluntary deed restrictions that are approved by the Administrator.

C. The wildlife habitat boundary and any associated buffer shall be identified on all plats, maps, plans and specifications submitted for the project.

3.037 Fish/wildlife habitat management and mitigation plan.

A. A fish/wildlife habitat management and mitigation plan shall be prepared by a qualified professional biologist who is knowledgeable of fish and wildlife habitat within North Central Washington.

B. In determining the extent and type of mitigation appropriate for the development, the plan shall evaluate the ecological processes that affect and influence critical area structure and function within the water shed or sub-basin; the individual and cumulative effects of the action upon the functions of the critical area and associated watershed; and note observed or predicted trends regarding specific wetland types in the watershed, in light of natural and human processes.

C. Where compensatory mitigation is necessary, the plan should seek to implement shoreline restoration objectives identified within the Douglas County Shoreline Restoration Plan, Appendix B.

D. The fish/wildlife habitat management and mitigation plan shall demonstrate, when implemented, no net loss of ecological functions of the habitat conservation area and buffer.

E. The fish/wildlife habitat management and mitigation plan shall identify how impacts from the proposed project shall be mitigated, as well as the necessary monitoring and contingency actions for the continued maintenance of the habitat conservation area and any associated buffer.

F. Mitigation Sequence.
When an alteration or impact to a critical area is proposed, the biologist shall demonstrate that all reasonable efforts have been taken to mitigate impacts in the following prioritized order:

1. Avoiding the adverse impact altogether by not taking a certain action or parts of an action, or moving the action.
2. Minimizing adverse impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology and engineering, or by taking affirmative steps to avoid or reduce adverse impacts.
3. Rectifying the adverse impact by repairing, rehabilitating or restoring the affected environment.
4. Reducing or eliminating the adverse impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the adverse impact by replacing, enhancing, or providing similar substitute resources or environments and monitoring the adverse impact and the mitigation project and taking appropriate corrective measures.

Mitigation for development may include a sequenced combination of the above measures as needed to achieve the most effective protection or compensatory mitigation for critical area functions.

G. Mitigation Ratios.

Mitigation ratios shall be used when impacts to aquatic habitat, or terrestrial buffers (Zone 1 + Zone 2), are unavoidable. Compensatory mitigation shall restore, create, rehabilitate or enhance equivalent or greater ecological functions. Mitigation shall be located onsite unless the biologist can demonstrate, and the county approves that onsite mitigation will result in a net loss of ecological functions. If offsite mitigation measures are determined to be appropriate, offsite mitigation shall be located in the same watershed as the development, within Douglas County.

The onsite mitigation ratio, (mitigation amount:disturbed area), shall be at a minimum ratio of 1:1 for development within aquatic habitat and terrestrial buffers (Zone 1 + Zone 2). A ratio of 2:1 shall apply to native vegetation removal within these areas. Mitigation for diverse, high quality habitat or offsite mitigation may require a higher level of mitigation. Mitigation and management plans shall evaluate the need for a higher mitigation ratio on a site by site basis, dependent upon the ecological functions and values provided by the habitat. Recommendations by resource agencies in evaluating appropriate mitigation shall be encouraged.

H. Plan Contents.

The fish/wildlife habitat management and mitigation plan shall contain a report including but not limited to, the following information:

1. Location maps, regional 1:24,000 and local 1:4,800;
2. A map or maps indicating the boundary of the habitat conservation areas; the width and length of all existing and proposed structures, utilities, roads, easements; wastewater and stormwater facilities; and adjacent land uses;
3. A description of the proposed project including the nature, density and intensity of the proposed development and the associated grading, structures, roads, easements, wastewater facilities, stormwater facilities, utilities, etc., in sufficient detail to allow analysis of such land use change upon the habitat conservation area;
4. A detailed discussion of surface and subsurface hydrologic features both on and adjacent to the site where the review authority determines appropriate;
5. A description of the vegetation in the habitat conservation area, on the overall project site and adjacent to the site;
6. A detailed description of the proposed project's effect on the habitat conservation area, and a discussion of any federal, state or local management recommendations which have been developed for the species or habitats in the area;
7. A plan which explains how any adverse impacts created by the proposed development will be mitigated to ensure no net loss of ecological function. Methods may include, but are not limited to the following techniques:
   a. Establishment of buffer zones,

b. Preservation of critically important plants and trees,
c. Limitation of access to the habitat conservation area,
d. Seasonal restriction of construction activities,
e. Establishment of a timetable for periodic review of the plan,
f. Direct lights away from the habitat conservation area and buffer,
g. Locate facilities that generate substantial noise away from the habitat conservation area and buffer,
h. Establish covenants that limit the use of pesticides within the buffer or habitat area,
i. Implement integrated pest management programs,
j. Post signs at the outer edge of the habitat conservation area or buffer to clearly indicate the location of the critical area according to the direction of the county,
k. Plant buffer with native vegetation appropriate for the region to create screens or barriers to noise, light, human intrusion and discourage domestic animal intrusion,
l. Use low impact development where appropriate, and
m. Application of management recommendations developed by the Washington State Department of Fish and Wildlife through its Priority Habitat Species Program.

8. A detailed discussion of on-going management practices which will protect the habitat conservation area after the project site has been fully developed, including proposed monitoring, contingency, maintenance and surety programs as provided for in Section 3.037 I of Appendix H.
9. A narrative which addresses Section 3.037 A-G, of Appendix H.
10. A description of the biologist's qualifications and experience.

I. Performance Standards.

The following performance standards shall apply to compensatory mitigation projects:

1. Mitigation planting survival will be 100% for the first year, and 80% for each of the 4 years following.
2. Mitigation must be installed no later than the next growing season after completion of site improvements, unless otherwise approved by the Administrator.
3. Where necessary, a permanent means of irrigation shall be installed for the mitigation plantings that are designed by a landscape architect or equivalent professional, as approved by the Administrator. The design shall meet the specific needs of riparian and shrub steppe vegetation.
4. Monitoring reports by the biologist must include verification that the planting areas have less than 20% total non-native /invasive plant cover consisting of exotic and/or invasive species. Exotic and invasive species may include any species on the state noxious weed list, or considered a noxious or problem weed by the Natural Conservation Services Department or local conservation districts.
5. Onsite monitoring and monitoring reports shall be submitted to Douglas County Transportation and Land Services 1 year after mitigation installation; 3 years

after mitigation installation; and 5 years after mitigation installation. The length of time involved in monitoring and monitoring reports may be increased by the Administrator for a development project on a case-by-case basis when longer monitoring time is necessary to establish or re-establish functions and values of the mitigation site. Monitoring reports shall be submitted by a qualified professional biologist. The biologist must verify that the conditions of approval and provisions in the fish and wildlife management and mitigation plan have been satisfied.

6. Mitigation sites shall be maintained to ensure that the mitigation and management plan objectives are successful. Maintenance shall include corrective actions to rectify problems, include rigorous, as-needed elimination of undesirable plants; protection of shrubs and small trees from competition by grasses and herbaceous plants, and repair and replacement of any dead plants.
7. Sequential release of funds associated with the surety agreement shall be reviewed for conformance with the conditions of approval and the mitigation and management plan. Release of funds may occur in increments of 1/3 for substantial conformance with the plan and conditions of approval. Verification of conformance with the provisions of the mitigation and management plan and conditions of approval after 1 year of mitigation installation shall also allow for the full release of funds associated with irrigation systems, clearing and grubbing and any soil amendments. If the standards that are not met are only minimally out of compliance and contingency actions are actively being pursued by the property owner to bring the project into compliance, the county may choose to consider a partial release of the scheduled increment. Non-compliance can result in one or more of the following actions: carryover of the surety amount to the next review period; use of funds to remedy the nonconformance; scheduling a hearing with the Douglas County Hearing Examiner to review conformance with the conditions of approval and to determine what actions may be appropriate.
8. Prior to site development and or building permit issuance, a performance surety agreement in conformance with Chapter 7 of this Program, must be entered into by the property owner and Douglas County. The surety agreement must include the complete costs for the mitigation and monitoring which may include but not be limited to: the cost of installation, delivery, plant material, soil amendments, permanent irrigation, seed mix, and 3 monitoring visits and reports by a qualified professional biologist, including Washington State Sales Tax. Douglas County must approve the quote for said improvements.

3.040 Application requirements.

Development permit applications shall provide appropriate information on forms provided by the review authority, including without limitation the information described below. Additional reports or information to identify potential impacts and mitigation measures to fish and wildlife habitat conservation areas may be required if deemed necessary. Development within a fish and wildlife habitat conservation area or its buffer shall provide the following information:

A. The location and dimensions of all existing and proposed buildings, roads and other improvements, and their physical relationship to the habitat conservation area;

B. The location and type of any proposed buffers, including the identification of any other protective measures.

C. Wildlife habitat boundary survey and ranking evaluation pursuant to Section 3.035 of Appendix H;

D. Habitat management and mitigation plan pursuant to Section 3.037 of Appendix H;

E. A drainage and erosion control plan pursuant to Section 1.100 of Appendix H;

F. A grading and excavation plan pursuant to Section 1.120 of Appendix H.

3.050 General standards.
The following minimum standards shall apply to all development activities occurring within designated habitat conservation areas and their associated buffers.

A. Except as permitted by this chapter habitat conservation areas and buffers will be left undisturbed, unless the development proposal demonstrates that impacts to the habitat conservation area and/or buffer are unavoidable, demonstrated by compliance with Section 3.037F of Appendix H. Impacts must be addressed with appropriate mitigation and enhancement measures as determined on a site-specific basis in conformance with Section 3.037 of Appendix H.

B. Habitat Conservation Areas.
   1. Development occurring within a one thousand foot radius of a state or federal threatened, endangered, or sensitive species den, nesting, or breeding site, migration corridors or feeding areas of terrestrial species shall require a habitat management and mitigation plan.
   2. Cliff, cave and talus slope habitats shall have at least a fifty-foot buffer for safety and resource protection.
   3. Bald Eagles: an approved bald eagle management plan by the Washington Department of Fish and Wildlife meeting the requirement and guidelines of the Bald Eagle Protection Rules, WAC 232-12-292, as amended, satisfies the requirements of a habitat management and/or mitigation plan.
   4. Rocky Mountain Mule Deer Habitat: habitat connectivity and migration corridors for mule deer shall be considered in habitat management and/or mitigation plans.
   5. Development in or over all surface waters shall require a habitat mitigation plan.
   6. Aquatic and High Quality Habitat Conservation Protection:
      a. Zone 1 - Aquatic Habitat buffers (Zone 1 buffer) are applicable to the Columbia River, lakes and ponds greater than 20 acres (>20 acres & > 6ft. in depth), as well as perennial and intermittent streams within shoreline jurisdiction . Zone 1 is established to protect aquatic habitat resources and protect water quality, by the filtering and uptake of chemical pollutants,

moderating temperature and reducing sediment reaching the shoreline ordinary high water mark.

b. Zone 2 – High Quality Habitat Conservation buffers (Zone 2 buffer), where applicable, are additive to the landward edge of Zone 1 buffers and are established to protect, preserve and even provide opportunity to restore biologically diverse core terrestrial habitat, which may include both riparian and upland habitat. An applicant or property owner who proposes a use or development within the shoreline jurisdiction shall hire a qualified biologist to determine if the site characteristics warrant an increase in buffer size to protect onsite ecological functions and values. The biologist shall prepare and submit a report which includes at a minimum the following items:
   1) Information documenting the described in Section 3.037(H)(1-6,10) of Appendix H.
   2) Current date stamped color photographs of the lineal width of the entire shoreline that depict habitat conditions within the shoreline jurisdiction, landward of the Aquatic environment designation.
   3) A written certified determination by the biologist as to whether any one of the criteria noted below apply to the project site:
      a) The initial 50% of Zone 1 is dominated by native riparian shrubs and/or trees, shrub-steppe habitat with connectivity to significant blocks of other shrub-steppe habitat, or a combination thereof;
      b) A proposed high-intensity land use (defined by Section 3.050(B)6.b.5) development will result in a net loss of ecological functions and values to Zone 1;
      c) If Sixty-five (65) percent of Zone 1 contains slopes which exceed 15% for the rural conservancy, urban conservancy, shoreline residential, or natural shoreline environment designations;
      d) If fifty (50) percent of Zone 1 contains slopes which exceed 15% for perennial streams, intermittent streams or the high intensity environment designation.
   4) If any one of the criteria in subsection 3.050B(6)(b)(3)a-d of Appendix H apply to the site, an addition of the Zone 2 buffer shall be required. If the only qualifying criterion is slope (subsection 3.050B(6)(b)(3)c or d of Appendix H), a 25 foot buffer shall be added to the Zone 1 buffer area in order to offer further water quality protection due to increase chemical and sediment pollutant runoff during storm events. As an alternative to the 25 foot water quality protection buffer, the property owner may submit an engineered stormwater pollution prevention plan & stormwater management plan for the development, for review and approval consistent with the best management practices of the Stormwater Management Manual for Eastern Washington, as amended. If any one (1) qualifying criteria (subsection 3.050B(6)(b)(3)a or b of Appendix H), or any combination of criteria (subsection 3.050B(6)(b)(3)a-d of Appendix H) is identified, then a minimum 50 foot buffer shall be added to the Zone 1 buffer area.

5) A description of proposed management practices that high intensity use(s) or development(s) will use to protect the buffer area after the project site has been fully developed, to ensure no net loss of ecological function. High intensity uses include commercial, industrial, institutional, retail sales, residential (greater than 1 unit/acre except single family residential development on existing legal lots of record in place at the time of adoption of this Program), conversion from non-agricultural lands to high-intensity commercial agriculture (dairies, nurseries, hobby farms, feed mills, packing plants, agricultural processing plants or warehouses for the purposes of processing, packing, and storage of agricultural products), and high-intensity recreation (golf courses, ball fields). Management practices may include, but are not limited to the following techniques:
   a) Preservation of critically important plants and trees,
   b) Limitation of access to the habitat conservation area,
   c.) Seasonal restriction of construction activities,
   d) Direct lights away from the habitat conservation area and buffer,
   e) Locate facilities that generate substantial noise away from the habitat conservation area and buffer,
   f) Establish covenants that limit the use of pesticides within the buffer or habitat area,
   g) Implement integrated pest management programs,
   h) Post signs at the outer edge of the habitat conservation area or buffer to clearly indicate the location of the critical area according to the direction of the county,
   i) Plant buffer with native vegetation appropriate for the region to create screens or barriers to noise, light, human intrusion and discourage domestic animal intrusion,
   j) Use low impact development where appropriate.

   A property owner may choose to default to the maximum combined Zone 1 + Zone 2 buffer in lieu of hiring a biologist to conduct site specific analysis. The default buffer width for perennial and intermittent streams in any environment designation shall be 125 feet. The default buffer width for the high intensity buffer environment designation shall be 125 feet. The default buffer width for rural conservancy, shoreline residential and the urban conservancy environment designations shall be 150 feet. The default buffer width for the natural environment designation shall be 200 feet.

c. Except as provided in this Program, the following minimum buffer widths shall apply within the shoreline environment designations administered by Douglas County. Provisions have been established for structural setbacks, measured from the landward edge of the buffer zones, established in Section 5.13, Bulk and Dimensional Standards, of this Program. Buffer widths include:

Environment Designations	**Zone 1**	**Zone 2**
Perennial and intermittent streams in all environment designations	75 feet	+0-50 feet
High Intensity	75 feet	+0-50 feet
Rural Conservancy, Shoreline Residential, Urban Conservancy	100 feet	+0-50 feet
Natural	150 feet	+0-50 feet

C. Appropriate buffer areas shall be maintained between all permitted uses and activities and designated habitat conservation areas.
   1. All buffers shall be measured from the habitat edge, as established by the approved habitat boundary survey. Zone 1 buffers shall be measured horizontally on both sides of the stream or waterbody landward of the ordinary high water mark.
   2. All buffer areas shall be temporarily fenced between the construction activity and the buffer with a highly visible and durable protective barrier during construction to prevent access and protect the designated habitat conservation area and associated buffer. The Administrator may waive this requirement if an alternative to fencing which achieves the same objective is proposed and approved.
   3. Except as otherwise allowed, buffers shall be retained in their natural condition. Any habitat created, restored or enhanced as compensation for approved habitat alterations shall have the standard buffer required for the type of habitat created, restored or enhanced.
   4. The width of the buffer shall be increased by the Administrator for a development project on a case-by-case basis when a larger buffer is necessary to protect the designated habitat conservation area function and value. The determination shall be based on site-specific and project-related conditions, which include without limitation:
      a. The designated habitat conservation area is used for feeding, nesting and resting by species proposed or listed by the federal or state government as endangered, threatened, sensitive, candidate, monitor or critical; or if it is an outstanding potential habitat for those species or has unusual nesting or resting sites such as heron rookeries or raptor nesting trees;
      b. The adjacent land is susceptible to severe erosion and erosion control measures will not effectively prevent adverse habitat impacts;

c. The report developed in compliance with Section 3.050(B)(6) of Appendix H indicates that the proposed high-intensity land use/ development would result in a net decrease in the Zone 1 + Zone 2 buffer's functions and values.

D. Buffer Width Averaging.
The total required (Zone 1 + Zone 2) buffer widths may be modified by the Administrator for a development on existing legal lots of record in place at the time of adoption of this Program, by averaging buffer widths based on a report submitted by the applicant and prepared by a qualified professional biologist. Buffer width averaging shall only be allowed where the applicant demonstrates all of the following:

1. Averaging is necessary to avoid an extraordinary hardship to the applicant caused by circumstances peculiar to the property;
2. The designated habitat conservation area contains variations in sensitivity due to existing physical characteristics or the character of the buffer varies in slope, soils, or vegetation;
3. The width averaging shall not adversely affect the designated habitat conservation area and buffer's functional value;
4. The total area contained within the buffer after averaging is no less than that contained within the standard buffer prior to averaging.
5. The minimum buffer width at its narrowest point shall not be less than seventy-five (75) percent of the buffer width established under Section 3.050.B of Appendix H.
6. Sites which have had buffer widths reduced or modified by any prior action administered by Douglas County are not eligible for the provisions of this section. Sites which utilize this provision are not eligible for any future buffer width reductions, under any provision of this Program, except as administered under Section 6.8 Variances, of this Program.
7. The variation of buffer widths on a site, via buffer width averaging, must be supported by best available science as demonstrated by the submittal and approval of a fish and wildlife habitat conservation area management and mitigation plan in conformance with Section 3.037 of Appendix H.

E. Administrative Buffer Reduction.
The Administrator shall have the authority to reduce buffer width(s) established in Section 3.050(B)(6) of Appendix H on a case-by-case basis for single family dwelling units which would be placed on existing legal lots of record in place at the time of adoption of this Program; provided that the general standards for avoidance and minimization per Section 3.037F of Appendix H shall apply, and when the applicant demonstrates to the satisfaction of the Administrator that all of the following criteria have been met:

1. The buffer reduction shall not result in a net loss of functions of the habitat conservation area or buffer.
2. The maximum buffer width reduction allowed shall not exceed twenty-five (25) percent of the total required buffer established in Section 3.050(B)(6) of Appendix H.

3. The buffer width reduction is contingent upon the submittal and approval of a fish and wildlife habitat conservation area management and mitigation plan in conformance with Section 3.037 of Appendix H.
4. Sites which have had buffer widths reduced or modified by any prior action administered by Douglas County are not eligible for the provisions of this section. Sites which utilize this provision are not eligible for any future buffer width reductions, under any provision of this Program, except as administered under Section 6.8 Variances, of this Program.

3.060 Specific standards.
The following standards shall apply to the activity identified below, in addition to the general standards outlined in Section 3.050 of Appendix H.

A. Stream Crossings. Expansion or construction of stream crossings may be authorized within a designated habitat conservation area and buffer, subject to the following minimum standards:
   1. Bridges are required for streams which support salmonids;
   2. All crossings using culverts shall use superspan or oversize culverts;
   3. Crossings shall not occur in salmonid spawning areas unless no other feasible crossing site exists;
   4. Bridge piers or abutments shall not be placed in either the floodway or between the ordinary high water marks unless no other feasible alternative placement exists;
   5. Crossings shall not diminish flood carrying capacity; and
   6. Crossings shall serve multiple properties whenever possible.

B. Water dependant uses, as defined by this Program, may be located within a habitat conservation area or buffer when the applicant or property owner can demonstrate compliance with Section 3.037 of Appendix H.

C. Construction of public, private community and private trails and trail-related facilities, such as picnic tables, benches, interpretive centers and signs, viewing platforms and campsites may be authorized within designated resource lands and critical areas, subject to the following minimum standards:
   1. Trail facilities shall, to the extent feasible, be placed on existing road grades, utility corridors, or any other previously disturbed areas;
   2. Trail facilities shall minimize the removal of trees, shrubs, snags and important habitat features. Vegetation management performed in accordance with best management practices as part of ongoing maintenance to eliminate a hazard to trail users is considered consistent with this standard;
   3. Viewing platforms, interpretive centers, campsites, picnic areas, benches and their associated access shall be designed and located to minimize disturbance of wildlife and/or critical characteristics of the affected conservation area;
   4. All facilities shall be constructed with materials complementary to the surrounding environment;

5. Trail facilities that parallel the shoreline may be located in the outer 25 percent of the buffer area; and
   a. Commercial and public trails shall not exceed 10 feet in width
   b. Private trails shall not exceed 4 feet in width;
6. Except as provided in C.5 above, the width of commercial and public trails shall be consistent with Section 1020.06(1) of the Washington State Design Manual as in now exists or may hereafter be amended;
7. Trails that provide direct shoreline access shall not exceed 4 feet in width and shall be kept to the minimum number necessary to serve the intended purpose;
8. Review and analysis of a proposed trail facility shall demonstrate no net loss of ecological functions and values in conformance with this chapter; and
9. Trail facilities shall not be exempt from special report requirements, as may be required by this chapter.

D. Developments authorized within a designated habitat conservation area or buffer shall comply with the following minimum standards:
   1. A habitat management and mitigation plan shall be required.
   2. Designated habitat conservation areas and their associated buffers shall be delineated and disclosed on final plats, maps, documents, etc., as critical area tracts, non buildable lots, buffer areas or common areas. Ownership and control may be transferred to a homeowner's association or designated as an easement or covenant encumbering the property.
   3. All lots within a major subdivision, short plat or binding site plan shall have the outer edge of all required buffers clearly marked on site with permanent buffer edge markers. Buffer markers may be either buffer signs or steel posts painted with a standard color and label, as approved by the Administrator. The markers shall be field verified by the surveyor or biologist of record prior to final plat approval. Each lot shall contain a minimum of three buffer area markers located at the landward edge of the buffer perimeter for each habitat type; one located at each side property line and one midway between side property lines. Covenants for the subdivision shall incorporate a requirement stating that buffer area markers shall not be removed, or relocated, except as a may be approved by the Administrator.
   4. Residential developments with the potential for two or more dwelling units shall disclose on the face of the plat whether the development will be served by joint use or community dock facilities or a combination thereof. Access easements and dock locations shall be identified by a qualified professional biologist who will address the standards of Section 3.037F of Appendix H. The identification of access easements and dock locations is not a substitute for permitting required in order to develop moorage facilities and in no way guarantees such an approval.

E. View Corridors.
   The development or maintenance of view corridors can provide the general public and property owners of single family residences, opportunities for visual access to water bodies associated with shoreline lots. One view corridor may be permitted per

lot, when consistent with the provisions of this Chapter. A mitigation and management plan consistent with Section 3.037 of Appendix H must be submitted for review and approval; either with a complete building permit application for a new single family residence or associated with an existing single family residence.

1. In addition to the submittal of a complete mitigation and management plan, an applicant must submit the following materials:
   a. A signed Douglas County Master Application form by the property owner of the shoreline proposed for vegetation alterations.
   b. A scaled graphic which demonstrates a side, top and bottom parameter for the view corridor with existing vegetation and proposed alterations. The view corridor shall be limited to 25% of the width of the lot, or 25 feet, whichever distance is less.
   c. A graphic and/or site photos for the entire shoreline frontage which demonstrates that the homesite and proposed or existing home does or will not when constructed have a view corridor of the water body, taking into account site topography and the location of shoreline vegetation on the parcel.
   d. Demonstration that the applicant does not have an existing or proposed shoreline access corridor or dock access corridor.
2. Applications for view corridors must also be consistent with the following standards:
   a. Native vegetation removal shall be prohibited.
   b. Pruning of native vegetation shall not exceed 30% of a tree's limbs, and shrubs shall not be pruned to a height less than 6 feet. No tree topping shall occur. Pruning of vegetation waterward of the ordinary high water mark is prohibited.
   c. Non-native vegetation within a view corridor may be removed when the mitigation and management plan can demonstrate a net gain in site functions, and where impacts are mitigated at a ratio of 2:1.
   d. Whenever possible, view corridors shall be located in areas dominated with non-native vegetation and invasive species.
   e. Pruning shall be done in a manner that shall ensure the continued survival of vegetation.
   f. The applicant's biologist shall clearly establish that fragmentation of fish and wildlife habitat will not occur, and that there is not a net loss of site ecological functions.
   g. View corridors are not permitted in the natural environment designation.
   h. A view corridor may be issued once for a property. No additional vegetation pruning for the view corridor is authorized except as may be permitted to maintain the approved view corridor from the regrowth of pruned limbs. Limitations and guidelines for this maintenance shall be established in the mitigation and management plan by the applicant's biologist, to be reviewed and approved by the Administrator.
   i. Sites which have had buffer widths reduced or modified by any prior action administered by Douglas County are not eligible for the provisions of this section. Sites which utilize this provision are not eligible for any future buffer

width reductions, under any provision of this Program, except as administered under Section 6.8 Variances, of this Program.

3.070 Variances.
Applicants who are unable to comply with the specific dimensional or performance standards of this chapter may seek approval pursuant to the variance standards of Section 6.8 Variances of this Program, in addition to satisfying the requirements identified below:

A. The project includes mitigation for unavoidable critical area and buffer impacts, consistent with the requirements of Section 3.037 of Appendix H.

B. The applicant can clearly demonstrate compliance with the avoidance and minimization standards established in subsection 3.037F of Appendix H.

CHAPTER 4 CRITICAL AREAS--
GEOLOGICALLY HAZARDOUS AREAS

4.010 Permitted uses and activities.

Uses and activities allowed within designated geologically hazardous areas are those uses permitted by the Douglas County Regional Shoreline Master Program, subject to the provisions of this chapter.

4.020 Classification.

A. All geologically hazardous areas shall be classified by Douglas County according to the level of risk associated with the hazardous area as established through an approved geologic hazard risk assessment and/or a geotechnical report submitted by the applicant in accordance with the provisions of this chapter. Douglas County may use on-site inspections and the information sources identified in Section 1.030 of Appendix H as guidance in identifying the presence of potential geologically hazardous areas.

B. Geologically hazardous areas in Douglas County shall be classified according to the following system:
   1. Known or suspected risk;
   2. No risk; and
   3. Risk unknown.

C. Any land containing soils, geology or slopes that meet any of the following criteria shall be classified as having a known or suspected risk of being geologically hazardous areas:
   1. Areas identified by the United States Department of Agriculture Natural Resources Conservation Service as having a “severe” rill and inter-rill erosion hazard;
   2. Areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include any areas susceptible because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Example of these may include, but are not limited to the following:
      a. Areas of historic failures, such as:
         1) Those areas delineated by the United States Department of Agriculture Natural Resources Conservation Service as having a “severe” limitation for building site development;
         2) Those areas mapped as class u (unstable), uos (unstable old slides), and urs (unstable recent slides) in the department of ecology coastal zone atlas; or
         3) Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published as the United States Geological Survey or Department of Natural Resources division of geology and earth resources.
      b. Areas with all three of the following characteristics:
         1) Slopes steeper than fifteen percent;

2) Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and
3) Springs or ground water seepage;

c. Areas that have shown movement during the Holocene epoch or which are underlain or covered by mass wastage debris of that epoch;
d. Slopes that are parallel or sub-parallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;
e. Slopes having gradients steeper than eighty percent subject to rockfall during seismic shaking;
f. Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action;
g. Areas that show evidence of, or are at risk from snow avalanches;
h. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding; and
i. Any area with a slope of forty-five percent or steeper and with a vertical relief of ten or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top and measured by averaging the inclination over at least ten feet of vertical relief.

3. Areas subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, soil liquefaction, or surface faulting. One indicator of potential for future earthquake damage is a record of earthquake damage in the past. Ground shaking is the primary cause of earthquake damage in Washington. The strength of ground shaking is primarily affected by:
   a. The magnitude of an earthquake;
   b. The distance from the source of an earthquake;
   c. The type of thickness of geologic materials at the surface; and
   d. The type of subsurface geologic structure.
4. Other geological events:
   a. Volcanic hazard areas shall include areas subject to pyroclastic flows, lava flows, debris avalanche, inundation by debris flows, mudflows, or related flooding resulting from volcanic activity.
   b. Mine hazard areas are those areas underlain by, adjacent to, or affected by mine workings such as adits, gangways, tunnels, drifts, or airshafts. Factors that should be considered include: Proximity to development, depth from ground surface to the mine working, and geologic material.

4.030 Designation.
All existing areas of unincorporated Douglas County classified as stated in Section 4.020 of Appendix H, as determined by the review authority, are designated as geologically hazardous areas.

4.040 Determination process—geologically hazardous area.
Douglas County shall review each development permit application to determine if the provisions of this chapter shall be initiated. In making the determination, the County may use any resources identified in Section 1.030 of Appendix H, as well as any previously completed special reports conducted in the vicinity of the subject proposal. The

following progressive steps shall occur upon a determination by the county that a geologically hazardous area may exist on a site proposed for a development permit:

A. Step One. Douglas County staff shall determine if there is any possible geologically hazardous area on-site designated by Section 4.030 of Appendix H. This determination shall be made following a review of information available and a site inspection if appropriate. If no hazard area is determined to be present, this chapter shall not apply to the review of the proposed development.

B. Step Two. If it is determined that a geologically hazardous area may be present, the applicant shall submit a geologic hazard area risk assessment prepared by an engineer or a geologist. The risk assessment shall include a description of the geology of the site and the proposed development; an assessment of the potential impact the project may have on the geologic hazard; an assessment of what potential impact the geologic hazard may have on the project; appropriate mitigation measures, if any; and a conclusion as to whether further analysis is necessary. The assessment shall be signed by and bear the seal of the engineer or geologist that prepared it. No further analysis shall be required if the geologic hazard area risk assessment concludes that there is no geologic hazard present on the site, nor will the project affect or be affected by any potential geologic hazards that may be nearby.

C. Step Three. If the professional preparing the risk assessment in step two concludes that further analysis is necessary, the applicant shall submit a geotechnical report consistent with the provisions of Sections 1.110 and 4.040D of Appendix H.

D. The geotechnical report shall include a certification from the engineering geologist or geotechnical engineer preparing the report, including the professionals stamp and signature. The geotechnical report shall include the following:
   1. A description of the geology of the site;
   2. Conclusions and recommendations regarding the effect of geologic conditions on the proposed development,
   3. Conclusions and recommendations on the suitability of the site to be developed;
   4. An evaluation of the actual presence of geologic conditions giving rise to the geologic hazard;
   5. An evaluation of the safety of the proposed project;
   6. Identification of construction practices, monitoring programs and other mitigation measures necessary;
   7. A bibliography of scientific citations shall be included as necessary;
   8. A statement regarding:
      a. The risk of damage from the project, both on- and off-site;
      b. Whether or not the project will materially increase the risk of occurrence of the hazard; and
      c. The specific measures incorporated into the design and operational plan of the project to eliminate or reduce the risk of damage due to the hazard.

E. All mitigation measures, construction techniques, recommendations and technical specifications provided in the geotechnical report shall be applied during the implementation of the proposal. The engineer of record shall submit sealed verification at the conclusion of construction that development occurred in conformance with the approved plans.

F. A proposed development cannot be approved if it is determined by the geotechnical report that either the proposed development or adjacent properties will be at risk of damage from the geologic hazard, or that the project will increase the risk of occurrence of the hazard, and there are no adequate mitigation measures to alleviate the risks.

CHAPTER 5 CRITICAL AREAS--
AQUIFER RECHARGE AREAS

5.010 Permitted uses and activities.
Uses and activities permitted within designated aquifer recharge areas are those that are authorized in the Douglas County Regional Master Program, subject to the provisions of this chapter.

5.020 Classification.
All aquifer recharge areas shall be classified by Douglas County as any area located within the ten year capture zone identified by the Douglas County wellhead protection program.

5.030 Designation.
All existing areas of unincorporated Douglas County classified as stated in Section 5.020 of Appendix H of this chapter, as determined by the review authority, are hereby designated as aquifer recharge areas. The provisions of this chapter are specific to the following described areas:

Area A (Regional Wellfield)- Commencing at the intersection of the Douglas County Boundary with a westerly extension of the north line of Government Lot 8 in Section 35, Township 24 North, Range 20 East, W.M., said point being the TRUE POINT OF BEGINNING FOR THIS DESCRIPTION. Thence easterly along said extended north line to the east shoreline of the Columbia River. Thence continuing easterly along the north line of said Government Lot 8 to the northwest corner of the Southeast quarter of the Southeast quarter of said Section 35. Thence continuing easterly along the north line of said Southeast quarter of the Southeast quarter to the centerline of SR-97. Thence northeasterly along said centerline to the east line of the Northwest quarter of the Southwest quarter of Section 36, Township 24 North, Range 20 East, W.M. Thence northerly along said east line to the southeast corner of the Southwest quarter of the Northwest quarter of said Section 36. Thence continuing northerly along the east line of said Southwest quarter of the Northwest quarter to the southwest corner of the Northeast quarter of the Northwest quarter of said Section 36. Thence easterly along the south line of said Northeast quarter of the Northwest quarter to the east line of the west half of said Northeast quarter of the Northwest quarter. Thence northerly along said east line to the shoreline of the Columbia River. Thence continuing northerly on a northerly extension of said east line to an intersection with the Douglas County Boundary and the END OF THIS DESCRIPTION.

Area B (19th Street Wellfield)- Commencing at the intersection of the Douglas County Boundary with a westerly extension of the south line of Government Lot 9 in Section 34, Township 23 North, Range 20 East, W.M., said point being the TRUE POINT OF BEGINNING FOR THIS DESCRIPTION. Thence easterly along said westerly extension to the shoreline of the Columbia River. Thence continuing easterly along the south line of said Government Lot 9 to the southeast corner of said Section 34. Thence easterly along the south line of Section 35, Township 23 North, Range 20 East, W.M. to an

intersection with a southerly extension of the easterly line of Lot 56, East Wenatchee Land Company's (EWLC) Plat of Sections 34 and 35, Township 23 North, Range 20 East, W.M. Thence northerly along said southerly extension to the northeast corner of said Lot 56. Thence westerly along the north line of said Lot 56 to the northwest corner of said Lot 56 and the southwest corner of Lot 41, said EWLC plat. Thence northerly along the west line of said Lot 41 and Lot 40, said EWLC plat to the northwest corner of said Lot 40. Thence westerly to the southeast corner of Lot 32, said EWLC plat. Thence westerly along the south line of said Lot 32 and Lot 31, said EWLC plat, to the southwest corner of said Lot 31. Thence westerly along a westerly extension of the south line of said Lot 31 to the shoreline of the Columbia River. Thence continuing westerly along said westerly extension to the Douglas County Boundary. Thence southeasterly along said Douglas County Boundary to the TRUE POINT OF BEGINNING.

Area C (Kentucky Street Wellfield)- Commencing at the intersection of the Douglas County Boundary with a southerly extension of the east line of Lot 364, East Wenatchee Land Company's (EWLC) Plat of Section 19, Township 22 North, Range 21 East, W.M., said point being the TRUE POINT OF BEGINNING FOR THIS DESCRIPTION. Thence northerly along said southerly extension to the shoreline of the Columbia River. Thence continuing northerly along the east line of said Lot 36 and the east line of Lots 29, 20, 13 and 4, said EWLC plat of Section 19, to the northeast corner of said Lot 4. Thence northerly to the southeast corner of the Southwest quarter of the Southwest quarter of the Southeast quarter of Section 18, Township 22 North, Range 21 East, W.M. Thence northerly along the east line of the West half of the Southwest quarter of the Southeast quarter of said Section 18 to the northeast corner of the Northwest quarter of the Southwest quarter of the Southeast quarter of said Section 18. Thence westerly along the north line of said Northwest quarter of the Southwest quarter of the Southeast quarter to the northwest corner of said section subdivision. Thence westerly to the northeast corner of Lot 1, Block 4, Plat of Eden Orchard Tracts. Thence westerly along the north line of said Lot 1 to the northwest corner of said Lot 1. Thence northerly to the southeast corner of Lot 3, Block 1, said Plat of Eden Orchard Tracts. Thence northerly along the east line of said Lot 3 to the northeast corner of said Lot 3. Thence westerly along the north line of said Lot 3 to the northwest corner of said Lot 3. Thence westerly to the northeast corner of Lot 4, Block 2, said Plat of Eden Orchard Tracts. Thence westerly along the north line of said Lot 4 and Lot 3, Block 2, said Plat of Eden Orchard Tracts, to the northwest corner of said Lot 3. Thence southerly along the west line of said Lot 3 to the southwest corner of said Lot 3. Thence westerly to the northeast corner of Lot 49, East Wenatchee Land Company's (EWLC) Plat of Section 13, Township 22 North, Range 20 East, W.M. Thence westerly along the north line of said Lot 49 and Lot 50, said EWLC plat of Section 13, to the northwest corner of said Lot 50. Thence southerly along the west line of said Lot 50 to the southwest corner of said Lot 50 and the northeast corner of Lot 62, said EWLC plat of Section 13. Thence westerly along the north line of said Lot 62 and the north line of Lot 61, said EWLC plat of Section 13, to the northwest corner of said Lot 61. Thence southerly along the west line of said Lot 61 to the southwest corner of said Lot 61. Thence southerly to the northwest corner of the Northeast quarter of Section 24, Township 22 North, Range 20 East, W.M. Thence

southerly along the west line of said Northeast quarter to the shoreline of the Columbia River. Thence continuing southerly along said west line to an intersection with the Douglas County Boundary. Thence southeasterly along said Douglas County Boundary to the TRUE POINT OF BEGINNING.

Bridgeport Area A (City of Bridgeport Wellhead Protection Area Well No. 1, 2, and 3) - Commencing at the intersection of the Douglas County boundary, the Columbia River and the west right of-way line of SR 17 in the Northeast one quarter of Section 23, Township 29 North, Range 25 East, WM. Douglas County; said point being the TRUE POINT OF BEGINNING FOR THIS DESCRIPTION. Thence southwesterly to the intersection of the south right-of-way line of SR 17 and SR 173. Thence westerly along the south right-of-way line of SR 173 to the intersection of 27 Street. Thence southwesterly along the centerline of 27 Street to the centerline of Monroe Avenue. Thence a southwesterly direction to the northeast corner of Lot 22 in the Cornehl Subdivision, Douglas County. Thence continuing in a westerly direction along to the intersection of the City of Bridgeport municipal boundary and section line between Sections 22 and 23 within Township 29 North, Range 25 East, WM. Thence continuing in a westerly direction along the Bridgeport municipal boundary approximately 1,400 feet to the sixteenth line of Section 22 in Township 29 North Range 25 East, WM. Thence continuing in a westerly direction to the intersection of Bridgeport municipal boundary and the centerpoint between Section 15 and 22 in Township 29 North, Range 25 East. WM. Thence running in a northerly direction to the intersection of the Bridgeport municipal boundary and the southwest corner of Lot 6 Browns First Addition in the northwest one quarter of Section 15 in Township 29 North, Range 25 East, WM. Thence continuing in a northerly direction to the intersection of the northwest property boundary of Lot 3 Browns First Addition and SR 173. Thence running in a northwesterly direction between Lots 2 and 3 to the centerline of Columbia Avenue and 3rd Street. Thence running in a northeasterly direction along the centerline of 3rd Street to the intersection of the Douglas County boundary and the Columbia River. Thence running in a southwesterly direction along the Columbia River to the true point of beginning.

5.040 Application requirements.
Development permit applications shall provide appropriate information on forms provided by the review authority. Additional special reports or information to identify potential impacts and mitigation measures to aquifer recharge areas may be required if deemed necessary by the review authority.

5.050 General standards.
The following minimum standards shall apply to all development activities occurring within designated aquifer recharge areas.

A. Development activities within an aquifer recharge area shall be designed, developed and operated in a manner that will not potentially degrade Douglas County groundwater resources.

B. Any changes in land use or type of new facilities where substances of moderate risk are used, stored, treated or handled; or which produce moderate risk waste shall be designed to prevent the release of any such materials into the groundwater.

C. The following uses and activities shall be prohibited within a designated aquifer recharge area:
   1. The conversion of heating systems to fuel oil or the installation of new fuel oil heating systems;
   2. Accumulation of junk materials;
   3. Hazardous substance treatment, storage and disposal facilities;
   4. The negligent transportation of hazardous substances materials;
   5. Solid waste and inert debris landfills, transfer stations, recycling facilities;
   6. Petroleum product pipelines;
   7. Class I, II, III, IV and V underground injection wells, except 5D2 storm drainage wells, 5G30 special drainage wells and 5R21 aquifer recharge wells as identified by the federal Safe Drinking Water Act;
   8. Mineral extraction.

5.060 Specific standards.
The following standards shall apply to the activity identified below, in addition to the general standards outlined in Section 5.050 of Appendix H.

A. Aboveground Storage Tanks or Vaults. Construction of an aboveground storage tank or vault, regardless of the storage capacity, for the storage of moderate substances or dangerous wastes as defined by WAC 173-303 may be authorized subject to the following standards:
   1. The design of the storage tank or vault shall include an impervious containment area enclosing or underlying the tank, which is large enough to contain one hundred twenty percent of the volume of the tank.
   2. Leak and release detection equipment shall be installed on all tanks and vaults.

B. Underground Storage Tanks and Vaults. Construction of an underground storage tank or vault, regardless of the storage capacity, for the storage of moderate substances or dangerous wastes as defined by WAC 173-303 may be authorized subject to the following standards:
   1. The design of the storage tank or vault shall include an impervious containment area enclosing or underlying the tank, which is large enough to contain one hundred twenty percent of the volume of the tank.
   2. All storage tanks and vaults shall either be cathodically protected against corrosion, constructed of noncorrosive materials, or steel clad with noncorrosive materials.
   3. The lining of all tanks and vaults shall be compatible to the substance to be stored.
   4. Leak and release detection equipment shall be installed on all tanks and vaults.

C. Stormwater Standards and Requirements for 5D2 "Stormwater Drainage Wells"; 5G30 "Special Drainage Wells" and 5R21 "Aquifer Recharge Wells" as Identified by the Federal Safe Drinking Water Act.

1. Soil Infiltration.
   a. Infiltration rates less than 2.4 inches per hour shall construct and maintain a pre-settling basin prior to discharge.
   b. Infiltration rates greater than or equal to 2.4 inches per hour shall provide water quality treatment using best management practices (BMP) prior to discharging to unsaturated soils.
2. Detention facilities shall be designed to reduce peak discharge and improve water quality.
   a. Detention volumes are represented by the area between the predeveloped and developed hydrograph for the county design storm. The minimum required to be retained in the detention basin before outfall to a stormwater drywell shall not exceed a volume for a six-month twenty-four-hour storm.
   b. Inlet and outlets placements shall be placed as far apart as possible to minimize short circuiting of the facility.
   c. All detention basins shall have an emergency overflow so the facility will not be damaged if runoff is exceeded.
3. Vegetated filter areas are vegetated channels that allow overland flow which effectively treats stormwater runoff.
   a. Flow depths shall not exceed six inches in depth and the preferred slope is two to four percent. Check dams with a six to twelve inch vertical drop shall be installed for slopes of four to six percent.
   b. The minimum length shall not be less than two linear feet.
   c. The maximum cross section shall not exceed three horizontal units to one vertical unit (3:1).
   d. The site shall be improved with a vegetative cover suitable for the filter area. Vegetation shall be permanently maintained in a manner acceptable to the county engineer.
4. Operation and Maintenance.
   a. The inlet flow spreader shall be kept free of leaves, rocks and other debris.
   b. Biofilters planted in grasses shall be mowed regularly to promote growth and pollutant uptake.
   c. Biofilters shall be periodically checked and sediments shall be removed by hand whenever sedimentation covers vegetation or begins to reduce the biofilter’s capacity. Damaged areas shall be reseeded.

D. Surface Impoundments. Surface impoundments, defined by Chapter 173-303 WAC, shall be designed by a professional engineer and constructed with an impermeable liner and other components as appropriate to prevent discharge of any material on the ground surface and/or into the groundwater system. Surface impoundments shall be designed and constructed in accordance with applicable governing law, and have a minimum excess capacity equal to one hundred twenty percent of the projected volume of liquid to be contained including intentional and unintentional stormwater capture.

E. Minor Developments. All minor developments, which are processed according to Chapter 7, subsection 7.3.020 of this Program, proposed within an aquifer recharge area shall comply with the following standards:
   1. Connection to a public sanitary sewer system or an approved community sewer system shall be required. If connection to sanitary sewer is not feasible, on-site septic systems proposed on lots of record legally existing on the date this chapter was enacted are permitted provided:
      a. The public health officer has designated the aquifer recharge area as an "area of special concern" in accordance with WAC 246-272-21501.
      b. The type of on-site system is approved by the Chelan-Douglas Health District upon finding that the design of the system will not be detrimental to the community water supply.
      c. The property owner shall enter a no protest agreement with the Douglas County Sewer District, or other sanitary sewer provider as appropriate to the property location, agreeing to not protest the formation of a local improvement district for the extension of sanitary sewer. This agreement shall be recorded with the Douglas County Auditor.
   2. The connection to an approved public water service shall be required.

F. Major Developments. All major developments processed according to Chapter 7, subsection 7.3.030 or 7.3.040 of this Program authorized within an aquifer recharge area shall comply with the following minimum standards:
   1. Connection to a public sanitary sewer system or an approved community sewer system shall be required unless the public health officer has designated the aquifer recharge area as an "area of special concern" in accordance with WAC 246-272-21501.
   2. Connection to an approved public water system shall be required.
   3. All existing wells located on the subject property shall either be properly abandoned in accordance with the requirements of the Chelan-Douglas Health District and the Department of Ecology or designated for irrigation purposes only. If an existing well is designated for irrigation purposes, then the following shall apply:
      a. Evidence of a water right issued by the State of Washington for the use of the well shall be presented to the review authority. An application for a water right is not acceptable evidence of an actual right to appropriate water.
      b. Certification from the public health officer stating that the well is properly constructed and sealed to prevent any contaminants from entering the wellhead shall be submitted to the review authority.
   4. Stormwater detention and retention facilities shall be designed using best available science and management practices to separate chemical and biological pollutants from the water prior to infiltration. The use of injection wells is prohibited in accordance with Section 5.050(C) of Appendix H.
   5. An analysis shall be conducted to assess the impact to groundwater quality from the potential of nitrate loading to the groundwater.
   6. Areas highly susceptible of transporting contaminants to the groundwater (i.e., natural drainages, springs, wetlands, etc.), as determined by the review authority,

shall be designated as open space. All impervious surfaces shall maintain a fifteen foot setback from areas identified as being highly susceptible and no amount of stormwater runoff shall be directed towards the susceptible area(s).

G. Parks, Schools and Recreation Facilities. Fertilizer and pesticide management practices of schools, parks, other recreation facilities and similar uses shall use best management practices as prescribed by the Washington State University Cooperative Extension Services.

H. All major and minor developments shall have an informational note placed on the face of plat stating "This subdivision is located within an aquifer recharge area. Best management practices shall be used for the containment of stormwater and the application of pesticides and fertilizers."

CHAPTER 6-- FLOOD DAMAGE PREVENTION

6.010 Purpose and objectives.

A. It is the purpose of this chapter to promote the public health, safety, and general welfare, comply with applicable state law and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:
   1. Protect human life and health;
   2. Minimize expenditure of public money and costly flood control projects;
   3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
   4. Minimize prolonged business interruptions;
   5. Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, roads and bridges located in areas of flood hazard;
   6. Help maintain a stable tax base by providing for the sound use and development in areas of flood hazard so as to minimize future flood blight areas;
   7. Provide a means by which potential purchasers of property can determine if that property is in an area of flood hazard; and
   8. Ensure that those who occupy the areas of flood hazard assume responsibility for their actions.

B. Methods of Reducing Flood Losses. In order to accomplish its purposes, this chapter includes methods and provisions for:
   1. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
   2. Requiring that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction;
   3. Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
   4. Controlling filling, grading, dredging, and other development, which may increase flood damage; and
   5. Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

6.020 Definitions.

Words, terms and phrases used in this chapter are defined in Chapter 8 Definitions, of this Program and supplemented herein. Unless specifically defined, words or phrases used in this chapter shall be interpreted so as to give them the meaning they have in common usage and to give this chapter it's most reasonable application.

A. "Area of shallow flooding" means a designated AO, or AH Zone on the Flood Insurance Rate Map (FIRM). The base flood depths range from one to three feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and, velocity flow may be evident. AO is characterized as sheet flow and AH indicates ponding.

B. “Area of special flood hazard” means the land in the floodplain subject to a one percent or greater chance of flooding in any given year. Designation on maps always includes the letter A.

C. “Basement” means any area of a building or structure having a floor that is subgrade, or below ground level, on all sides.

D. “Critical facility” means a facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to, schools, nursing homes, convalescent homes, hospitals, police facilities, fire protection facilities, emergency response facilities, and installations which produce, use or store hazardous materials and/or hazardous waste.

E. “Elevated building” means, for insurance purposes, a nonbasement building which has its lowest elevated floor raised aboveground level by foundation walls, shear walls, post, piers, pilings, or columns.

F. “Existing manufactured home park or subdivision” means a manufactured home park subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before July 13, 1987.

G. “Expansion to an existing manufactured home park or subdivision” means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

H. “Lowest floor” means the lowest floor or the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a building’s lowest floor, provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this chapter found at Section 6.050(B)(1)(b) of Appendix H.

I. “New construction” means structures for which the “start of construction” commenced on or after the effective date of the requirements established in this chapter.

J. “New manufactured home park or subdivision” means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of

utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after July 13, 1987.

K. “Start of construction” includes substantial improvement, and means the date the building permit was issued; provided, the actual start of construction, repair, reconstruction, placement or other improvement was within the one hundred eighty days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation such as clearing, grading and filling; nor does it include the installation of roads and/or walkways; nor does it include excavation for a basement, footings, piers, or foundation or the erection of temporary forms; nor does it include the installation on the property of accessory buildings such as garages or sheds not occupied as dwelling units or not part of the main structure.

L. “Structure” means a walled and roofed building including a gas or liquid storage tank or manufactured home that is principally aboveground.

M. “Substantial damage” means damage of any origin, including intentional and unintentional demolition, sustained by a structure whereby the cost of restoring the structure exceeds fifty percent of its value before damage as determined by using the most recent ICBO construction tables.

N. “Substantial Improvement” means:
   1. Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds fifty percent of the value of the structure, as determined by using the most recent ICBO construction tables, either:
      a. Before the improvement or repair is started, or
      b. If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition “substantial improvement” is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimension of the structure.
   2. The term substantial improvement does not, however, include either:
      a. Any project for the improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions; or
      b. Any alteration of a structure listed on the national register of historic places or a state inventory of historic places.

6.030 General provisions.

A. Lands to Which This Chapter Applies. This chapter shall apply to all flood hazard areas within the unincorporated areas of the county within shoreline jurisdiction.

B. Basis for Establishing the Areas of Flood Hazard. The areas of flood hazard identified by the federal insurance administration in a scientific and engineering report entitled “The Flood Insurance Study for the Unincorporated Areas” dated July 17, 1978, and as revised on May 17, 1982, with accompanying flood insurance rate maps is adopted by reference and declared to be a part of this chapter. The flood insurance study is on file at the offices of the Douglas County Department of Transportation and Land Services. Flood hazard areas also include those areas not designated in the flood insurance study but that have a historical pattern of flooding and mudslides. The best available information for flood hazard area identification as outlined in Section 6.040(D)(2) of Appendix H shall be the basis for regulation until a new FIRM is issued which incorporates the data utilized under that section.

C. Reference Datum. Certifications of the elevations of sites, structures and base flood levels shall use NAVD 1988 for the reference datum.

D. Compliance. No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this chapter and other applicable regulations.

E. Abrogation and Greater Restrictions. This chapter is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions, however, where this chapter and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

F. Interpretation. In the interpretation and application of this chapter, all provisions shall be:
   1. Considered as minimum requirements;
   2. Liberally construed in favor of the board of commissioners and the review authority; and
   3. Deemed neither to limit nor repeal any other power.

G. Warning and Disclaimer of Liability. The degree of flood protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by manmade or natural causes. This chapter does not imply that land outside the areas of flood hazard or uses permitted in such areas will be free from flooding or flood damages. This chapter shall not create liability on the part of the county, any officer or employee thereof, for any flood damages that result from reliance on this chapter, any administrative decision lawfully made thereunder, or unauthorized actions by others.

6.040 Administration.

A. Establishment of Development Permit. A development permit shall be obtained before construction or development begins within any area of flood hazard established in Section 6.030(B) of Appendix H. The permit shall be for all buildings

and structures including manufactured homes, as defined in Chapter 8 Definitions, of this Program and Section 6.020 of Appendix H, and for all other development, including fill and other activities, also defined in Chapter 8 Definitions, of this Program and Section 6.020 of Appendix H. Depending upon the nature of the development, the proposal may also require review and approval of shoreline permits as specified by this Program.

B. Application for Development Permit. Application for a development permit shall be made on forms furnished by the review authority. The information to be submitted with the application shall be submitted in addition to that information necessary to obtain other permits, as well as for those developments and substantial improvements which require no other permit approvals and may include, but not be limited to:
   1. The nature, location, dimensions, and elevations of the project site;
   2. Typical cross sections disclosing both existing ground elevations, proposed ground elevations, height of existing structures, and height of proposed structures;
   3. Proposed land contours, where appropriate, if development involves grading, filling, cutting, or other alterations of land contours. When required, contours shall be at two-foot intervals for land with a slope of ten percent or less and five-foot intervals for land with a slope greater than ten percent;
   4. Dimensions and locations of existing structures to be maintained;
   5. Dimensions and locations of proposed structures;
   6. The source, composition and volume of fill materials;
   7. The composition and volume of any excavated materials and the identification of the proposed disposal site;
   8. The location of existing and proposed utilities such as water, sanitary sewer, storm water drainage, septic tanks and drainfields, gas and electricity;
   9. The elevation in relation to mean sea level, of the lowest floor (including basement) of all structures as certified by an engineer, surveyor or architect;
   10. The elevation in relation to mean sea level to which any structure has been flood proofed as certified by an engineer, surveyor or architect;
   11. Certification by an engineer or architect that the flood proofing methods for any nonresidential structure meet the flood proofing criteria in Section 6.050(B)(2) of Appendix H;
   12. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development; and
   13. Certification by an engineer demonstrating that any alteration or encroachments shall not result in any increase in flood levels during the occurrence of a base flood discharge.

C. Designation of the Review Authority. The Administrator is appointed to implement this chapter by granting or denying development permit applications in accordance with its provisions.

D. Duties and Responsibilities of the Review Authority. Duties of the review authority shall include, but not be limited to:
   1. Permit Review.
      a. Review all development permits to determine the permit requirements of this chapter have been satisfied;
      b. Refer development permit applications to federal, state, or local governmental agencies as appropriate in order for those agencies to determine applicability of their permit requirements to the development and enable them to contact the applicant directly regarding those requirements;
      c. Review all development permits to determine if the proposed development is located in the floodway. If located in the floodway, assure that the encroachment provisions of Section 6.050(D)(1) of Appendix H are met.
   2. Use of Other Base Flood Data. When base flood elevation data has not been provided in accordance with Section 6.030(B) of Appendix H, the review authority may obtain, review and reasonably utilize any base flood elevation and floodway data available from a federal, state or other source, in order to administer Section 6.050(B) and (D) of Appendix H.
   3. Information to be Obtained and Maintained.
      a. Where base flood elevation data is provided through the flood insurance study or required as in Section 6.040(D)(2) of Appendix H, obtain and record the certifications of the actual elevation (in relation to mean sea level) of the base flood elevation and the lowest habitable floor (including basement) of all new or substantially improved structures, and whether or not the structure contains a basement.
      b. For all new or substantially improved flood proofed structures:
         1) Maintain the certifications of the actual elevation (in relation to mean sea level); and
         2) Maintain the flood proofing certifications required in section 6.040(B)(11) of Appendix H.
   4. Alteration of Watercourses.
      a. Notify adjacent communities and the Washington State Department of Ecology prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the federal insurance administration; and
      b. Require that maintenance be provided within the altered or relocated portion of the watercourse so that the flood-carrying capacity is not diminished.
   5. Interpretation of FIRM Boundaries. Make interpretations where needed, as to exact location of the boundaries of the areas of flood hazard (for example, where there appears to be a conflict between a mapped boundary and actual field conditions).

6.045 Variance procedure.

A. The Douglas County Hearing Examiner shall hear and decide requests for variances from the requirements of this chapter and appeals of decisions made after full administrative review (Subsection 7.3.030 of Chapter 7 of this Program).

B. There shall be no administrative appeal of a decision of the hearing examiner. An appeal of a decision of the hearing examiner shall be timely filed as a judicial appeal in the superior court in accordance with Section 6.15 of this Program.

C. The hearing examiner shall consider all technical evaluations, all relevant factors, standards specified in other sections of this chapter, and the following:
   1. The danger that materials may be swept onto other lands to the injury of others;
   2. The danger to life and property due to flooding or erosion damage;
   3. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
   4. The importance of the services provided by the proposed facility to the community;
   5. The necessity to the facility of a waterfront location, where applicable;
   6. The availability of alternative locations for the proposed use that are not subject to flooding or erosion damage;
   7. The compatibility of the proposed use with existing and anticipated development;
   8. The relationship of the proposed use to the comprehensive plan and flood plain management program for that area;
   9. The safety of access to the property in times of flood for ordinary and emergency vehicles;
   10. The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and
   11. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.

D. Upon consideration of the factors of 6.045 C of Appendix H and the purposes of this chapter, the hearing examiner may attach such conditions to the granting of variances as deemed necessary to further the purposes of this chapter.

E. The review authority, or his/her designee, shall maintain the records of all appeal actions and report any variances to the Federal Insurance Administration upon request.

F. Criteria for variances:
   1. Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, provided that items 1 through 11 in 6.045 C of Appendix H have been fully considered. As the lot size increases the technical justification required for issuing the variance increases.
   2. Variances may be issued for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in this section.

3. Variances shall not be issued within a designated floodway if any increase in flood levels during the base flood discharge would result.
4. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
5. Variances shall only be issued upon:
   a. A showing of good and sufficient cause;
   b. A determination that failure to grant the variance would result in exceptional hardship to the applicant;
   c. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public as identified in Section 6.045 C of Appendix H or conflict with existing local laws or ordinances.
6. Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece or property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from the flood elevations should be quite rare.
7. Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of flood proofing than watertight or dry-flood proofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except Section 6.045 F.1. of Appendix H, and otherwise complies with Section 6.050 A.1 of Appendix H (anchoring) and Section 6.050 A.2 of Appendix H (construction materials and methods).
8. Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.

6.050 Provisions for flood hazard reduction.

A. General Standards. In all areas of flood hazard the following standards are required:
   1. Anchoring.
      a. All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure.
      b. All manufactured homes must likewise be anchored to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques).
   2. Construction Materials and Methods.
      a. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

b. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.
c. Electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

3. Utilities.
   a. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the system;
   b. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharge from the systems into floodwaters; and
   c. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.
4. Subdivisions, short subdivisions and binding site plans.
   a. All subdivisions, short subdivisions and binding site plans shall be consistent with the need to minimize flood damage;
   b. All subdivisions, short subdivisions and binding site plans shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage;
   c. All subdivisions, short subdivisions and binding site plans shall have adequate drainage provided to reduce exposure to flood damage;
   d. The base flood elevation shall be disclosed on the face of a final plat, final short plat or final binding site plan in a manner specified by the review authority. Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated by the applicant for a subdivision, short subdivision, binding site plan or other proposed development; and
   e. A disclosure statement shall be placed on the face of final plats, final short plats and final binding site plans advising property owners and potential purchasers of the potential flood hazard on the property, and that certain activities are subject to compliance with this chapter and other applicable provisions of this Program.
5. Review of Building Permits. Where elevation data is not available, either through the flood insurance study or from another authoritative source (see Section 6.040(D)(2) of Appendix H), applications for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes certification by an engineer and use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

B. Specific Standards. In all areas of flood hazard where base flood elevation data has been provided as set forth in Section 6.030(B) of Appendix H or Section 6.040(D)(2) of Appendix H, the following provisions are required:
   1. Residential Construction.

a. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated to or above one foot higher than the base flood elevation.
b. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must be certified by an engineer or architect and must meet or exceed the following minimum criteria:
    1) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided;
    2) The bottom of all openings shall be no higher than one foot above grade;
    3) Openings may be equipped with screens, louvers, or other coverings or devices, provided, that they permit the automatic entry and exit of floodwaters.

2. Nonresidential Construction. New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated to or above one foot higher than the base flood elevation; or, together with attendant utility and sanitary facilities, shall:
    a. Be flood proofed so that below one foot above the base flood elevation the structure is watertight with walls substantially impermeable to the passage of water;
    b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
    c. Be certified by an engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions of this subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the review authority;
    d. Nonresidential structures that are elevated, not flood proofed, must meet the same standards for space below the lowest floor as described in Section 6.050(B)(1)(b) of Appendix H.
    e. Applicants that are flood proofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the flood proofed level (e.g. a building flood proofed to the base flood level will be rated as one foot below).
3. Manufactured Homes. All manufactured homes to be placed or substantially improved within Flood Zones A1-30, AH, and AE shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above one foot higher than the base flood elevation and be securely anchored to an adequately designed foundation system to resist flotation, collapse and lateral movement in accordance with the provisions of Section 6.050(A)(1)(b) of Appendix H.

C. Recreational Vehicles. Recreational vehicles placed on sites within Flood Zones A, A1-30, and AE shall be on the site for fewer than one hundred eighty consecutive days unless parked at an occupied single family residence, be fully licensed and ready for highway use, is on its wheels or a jacking system, is attached to the site only by quick disconnect type utility and security systems, and has no permanently attached additions.

D. Floodways. Located within areas of flood hazard established in Section 6.030(B) of Appendix H are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters, which carry debris, potential projectiles, and erosion potential, the following provisions apply:
   1. Encroachments and obstructions, including fill, new construction, substantial improvements, and other uses are prohibited unless certification by a engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge;
   2. If subdivision 1 of this subsection D is satisfied, all new nonresidential construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of this chapter.
   3. Construction or reconstruction of residential structures is prohibited within designated floodways except for repairs or improvements to a structure which do not increase the ground floor areas, the value of which in any twelve month period does not exceed fifty percent of the value of the structure, as determined by using the current ICBO construction tables either:
      a. Before the repair or improvement is started, or
      b. If the structure has been damaged by any means or demolished to any extent, and is being restored, before damage occurred.

      Not included in the fifty percent value standard are repairs or improvements to buildings and structures to comply with existing health, sanitary, or safety codes that have been identified by the review authority and that are the minimum necessary to assure safe living conditions or repairs or improvements to buildings or structures identified as historic places.

E. Grading and Filling. No fill, including fill for roads, and levees, grading; or excavating that unduly affects the efficiency or the capacity of the flood channel or floodway, or unduly decreases flood storage or increases flood heights, shall be permitted. Any proposed fill to be deposited in a flood hazard area shall not be contrary to the need for storage of floodwater nor shall the amount of fill be greater than is necessary to achieve the purpose for which the fill is intended. Fill materials shall be clean with a minimal potential for degrading water quality. All fill materials shall be protected against erosion with retaining walls or other mechanisms to deter erosion. If vegetative cover is chosen, the side slopes of the fill should not exceed two units of horizontal distance to one unit of vertical distance. All grading and fill activities shall be designed and certified by an engineer to conform to all applicable provisions of this Program.

F. Shallow Flood Areas (AO Zones) with Depth Designations.

1. Shallow flooding areas appear on the FIRM as AO zones with depth designations. The base flood depth in these zones range from one to three feet where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. In these areas, the following provisions apply:
   a. New construction and substantial improvements of residential structures within AO zones shall have the lowest floor (including basement) elevated above the highest grade adjacent to the building, one foot or more above the depth number specified on the FIRM, and at least two feet if no depth number is specified.
   b. New construction and substantial improvements of nonresidential structures within AO zones shall either:
      1) Have the lowest floor (including basement) elevated above the highest grade adjacent to the building site, to or above the depth number specified on the FIRM and at least two feet if no depth number is specified; or
      2) Together with attendant utility and sanitary facilities, be completely flood proofed to or above that level so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. An engineer or architect shall certify compliance as in Section 6.050(B)(2)(c) of Appendix H if this method is used;
   c. Adequate drainage paths designed by an engineer shall be required around structures on slopes to guide floodwaters around and away from proposed structures.
   d. Recreational vehicles placed on sites within an AO zone must either:
      1) Be on the site for fewer than one hundred eighty consecutive days, or
      2) Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or
      3) Meet the requirements of Section 6.050 F of Appendix H and the elevation and anchoring requirements for manufactured homes.
2. Where hazardous velocities are noted on the FIRM, consideration shall be given to mitigating the effects of these velocities through proper design and construction techniques and methods.

G. Encroachments. The cumulative effort of any proposed development, where combined with all other existing and anticipated development, shall not increase the water surface elevation of the base flood more than one foot at any point as certified by an engineer.

6.060 Critical facilities.

Construction of new critical facilities shall be, to the extent possible, located outside the limits of a flood hazard area. Construction of new critical facilities shall be permissible within a flood hazard area if no alternative feasible site is available. Critical facilities constructed within a flood hazard area shall have the lowest floor elevated three feet or

more above the level of the base flood at the site. Flood proofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into floodwaters. Access routes elevated to or above the level of the base flood elevation shall be provided to all critical facilities to the extent possible. The review authority shall require design and construction certifications prepared by an engineer, architect or surveyor, as appropriate to the aspect of the development, to assure compliance with this section and other applicable provisions of this Program.